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MILK PRICING

New Method for Setting Farm Milk Prices Needs to Be Developed

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Resources, Community, and
Economic Development Division

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November 3, 1989

The Honorable Patrick Leahy
The Honorable Rudy Boschwitz
The Honorable Bob Kasten
United States Senate

Pursuant to your request of February 23, 1988, this report discusses the Minnesota-Wisconsin series, which is used to establish minimum prices for milk used in manufacturing dairy products. The report also discusses alternatives to the Minnesota-Wisconsin price series.

The report contains recommendations to the Secretary of Agriculture directed at developing and testing an alternative to the Minnesota-Wisconsin price series.

Unless you publicly announce its contents earlier, we plan no further distribution of this report for 14 days from the date of this letter. At that time, we will send copies to the appropriate Congressional Committees, the Secretary of Agriculture, and other interested parties.

This work was done under the direction of John W. Harman, Director, Food and Agriculture Issues (202) 275-5138. Other major contributors are listed in appendix IV.

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Traditional federal dairy policy objectives include ensuring an adequate supply of quality milk, stabilizing milk prices, and improving producer income. To achieve these objectives, the Congress created two interrelated programs—federal milk marketing orders and the price support program. These programs are administered by the U.S. Department of Agriculture (USDA). The mechanism used to set minimum prices for milk marketing orders is the Minnesota-Wisconsin (M-W) price series. This series prices over 70 percent of all domestically produced milk.

A 1988 GAO report, Milk Marketing Orders: Options For Change (GAO/RCED-88-9, Mar. 21, 1988), discussed the impact of marketing orders and set forth options for change. Subsequently, Senators Patrick Leahy, Rudy Boschwitz, and Bob Kasten requested that GAO (1) determine whether the M-W price series is a reliable and appropriate adjuster of milk prices, (2) determine whether the M-W price series needs to be improved, and (3) develop recommendations for improving the pricing system for milk used in manufacturing, if warranted.

Background

Dairy producers sell either grade A or grade B milk. Grade A milk can be used for fluid consumption or for manufacturing and is produced under higher quality standards than grade B milk. Grade B milk is used only for manufacturing dairy products and is not regulated by federal milk marketing orders.

Through the price support program, the government supports the price of milk sold for manufacturing uses by offering to purchase any quantities of butter, cheese, and nonfat dry milk that are offered at specified prices. The government's purchase prices, which include allowances to cover processing costs and profits, are derived from a planned support price for milk. While the price support program is intended to establish a floor on grade B milk prices, it does not always prevent market conditions from causing the price to go below that floor. Periodically, market conditions can cause the price to rise above that floor.

The M-W price is the estimated average price paid for grade B milk by plants in Minnesota and Wisconsin. Milk marketing orders use the M-W price as the minimum price for grade A milk used for manufactured products and set minimum fluid milk prices based on that price. The M-W price is intended to reflect a market-determined price for milk used for manufacturing in Minnesota and Wisconsin, which produce over 50 percent of the nation's grade B milk.

GAO's 1988 report suggested that the Congress consider reducing the federal role in milk pricing through a sequence of steps. These steps would be made incrementally to allow time for the dairy industry to adjust and for the government to monitor such adjustments to ensure that unanticipated adverse effects did not occur. Until this step-by-step process reaches the point of eliminating all aspects of federal order pricing, a mechanism is needed to set minimum prices.

The 1988 report was a policy analysis report that assessed various policy options for changing the current milk marketing order system. In contrast, this report evaluates alternative technical bases for pricing most milk nationally within the current or modified system for regulating milk.

Results in Brief

If present trends continue, the validity of the M-W milk price series as a basis for establishing milk prices will become increasingly questionable. Declines in grade B milk production and in the number of grade B purchasing plants will gradually reduce its reliability as an accurate indicator of the price of milk used in manufacturing dairy products.

GAO, with the assistance of three consultants—experts in agricultural economics—evaluated five alternatives to the current M-W price series. GAO believes these five represent the range of the primary viable alternatives under the current marketing order system and some of the proposed modifications to that system outlined in GAO's 1988 report. GAO evaluated these alternatives in terms of the extent to which they (1) reflect national prices of manufactured dairy products, (2) reflect national supply-demand conditions for milk used for manufacturing, (3) generate a price that is not significantly affected by local conditions, (4) provide a valid mechanism for setting milk prices over the long term, and (5) are automatic and self-adjusting. The current M-W price is becoming gradually less reliable as a measure of national supply-demand conditions for milk used for manufacturing, does not provide a valid pricing mechanism over the long term, and is affected by local conditions.

GAO's Analysis

Grade B Production Decline

Grade B milk production and the number of grade B purchasing plants in Minnesota and Wisconsin have declined significantly since the M-W price series was introduced. In 1965, grade B milk production in Minnesota and Wisconsin totaled about 19 billion pounds and accounted for 67 percent of milk produced in the two states. By 1988, grade B milk production in the two states was about 8 billion pounds and accounted for 22 percent of the milk produced in these two states. This decline has occurred because of financial incentives for converting to grade A production and more restrictive standards for grade B production. If recent production trends continue, total grade B production in these two states could be as low as about 5 billion pounds by the year 2000. In addition, the number of plants in Minnesota and Wisconsin that purchase grade B milk has declined from about 1,325 in the 1960s to about 315 in 1989. Thus, the rationale for M-W pricing—that it reflects a market-determined price for milk used in manufacturing dairy products—has eroded and may soon no longer exist.

Other M-W Deficiencies

There are also concerns about the representativeness of the plant samples and the way data are collected. The samples of plants that report data used to determine the M-W price may have become less representative of grade B purchasing plants. Factors relating to data collection also distort the M-W price. Farm-to-plant milk-hauling subsidies to producers are not taken into consideration in prices reported to USDA. Also, USDA adjusts the reported prices to a standard content level for one component (butterfat) but not for other components used in Minnesota and Wisconsin milk pricing.

Alternative Pricing Mechanisms

GAO evaluated five alternatives to the current price series that fall into three categories—those intended to reflect a market-determined price, those determined by a formula, and those administratively determined. The following are the five alternatives GAO evaluated:

- A regulated grade A manufacturing price series that would operate like the M-W price series, except that prices of grade A milk used in manufacturing under milk marketing orders, along with grade B milk prices, would be used to determine the pricing base.

- A deregulated grade A price series that would also operate like the M-W price series, except that, to establish a pricing base, grade A manufacturing milk prices would be collected from selected plants removed from federal milk marketing orders, along with the grade B milk prices.
- A product formula that would derive milk's value from dairy product prices.
- An economic formula that would use broad economic factors, such as production costs and the Consumer Price Index, to establish milk price changes.
- An administratively determined price that would be set through an administrative process, such as a committee, hearing, or panel.

Both the regulated and deregulated grade A manufacturing milk price series would reflect national prices of manufactured dairy products and national supply-demand conditions for milk used for manufacturing because they would be based on a large volume of milk. These series would generate a price that would generally not be affected by local conditions. They would also provide a valid mechanism for setting prices over the long-term, be automatic, and be self-adjusting. In GAO's view, however, the deregulated grade A series is less desirable because it would treat some producers unequally. They would no longer share in some of the benefits of marketing orders and may receive lower prices for their milk.

Between the economic and product formulas, the product formula is superior. Product formulas do the best job of reflecting national prices of manufactured dairy products and national supply-demand conditions for milk used for manufacturing. They are also less likely to be affected by local conditions than is a regulated grade A price. In addition, they would be automatic and self-adjusting and would provide a mechanism for setting prices over the long-term. In contrast, economic formulas would not necessarily reflect the prices of manufactured dairy products or supply-demand conditions for milk used for manufacturing. However, they would have the other characteristics of the product formula.

Generally, the administered price alternative does not have the desired characteristics of a pricing mechanism. Without frequent adjustments, it would not reflect prices of manufactured dairy products nor national supply-demand conditions for milk used for manufacturing.

GAO did not attempt to predict (1) how much of a differential would exist between the M-W price and price levels resulting from the various

alternatives nor (2) the impact on the retail price of milk or milk products. However, any of the five alternatives GAO evaluated could be phased in over time. They could be adjusted to ensure that the net price to the producer would not immediately change dramatically as a result of changing from the M-W price series to a new price series.

Recommendations

As long as milk prices continue to be regulated, there will be a need for a pricing system to fill the role now played by the M-W price series. In view of the declining importance of grade B milk, GAO recommends that the Secretary of Agriculture initiate efforts to develop and test a new pricing series. GAO believes that the alternatives discussed in this report can provide a useful starting point for such an effort by USDA.

Agency Comments and GAO's Evaluation

USDA stated that, in its view, the M-W price is still as good a means as exists for moving minimum class prices in federal order markets. However, the Department acknowledged that an alternative mechanism will have to eventually replace the M-W price series and noted that this report can provide the framework for doing so.

While the M-W series may currently be a reliable basis for establishing milk prices, significant declines in grade B milk production and in the number of grade B purchasing plants are reducing its reliability as a fair indicator of the value of milk used in manufacturing. Further, because the replacement of the M-W price will probably be a difficult and lengthy process, GAO believes that USDA should initiate the process of developing and testing alternatives to the M-W price at this time.

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Abbreviations

GAO	General Accounting Office
M-W	Minnesota-Wisconsin price series
RCED	Resources, Community, and Economic Development Division
USDA	U.S. Department of Agriculture

Introduction

Federal dairy policy objectives include (1) ensuring consumers of an adequate supply of good quality milk, (2) stabilizing milk prices, and (3) improving producers' income. To fulfill these objectives, the Congress created two interrelated programs—federal milk marketing orders and the price support program, both of which are administered by the U.S. Department of Agriculture (USDA). Milk marketing orders establish minimum prices that processors and manufacturers (plants) must pay producers for grade A milk. The mechanism used to establish these minimum prices is known as the Minnesota-Wisconsin (M-W) price series. This series is based on the price dairy producers in Minnesota and Wisconsin receive for grade B milk. The M-W price becomes the basis for pricing all milk sold under federal marketing orders (over 70 percent of all milk produced in the United States).

Dairy producers sell either grade A or grade B milk. Grade A milk production must adhere to sanitation standards for milk production that are higher than those for grade B milk. Grade A milk, representing 90 percent of total U.S. 1988 milk production, can be sold for either fluid or manufacturing use. In 1988 about 43 percent of grade A milk was used for fluid products. Grade A milk not needed for fluid use goes to manufacturing uses. Grade B milk can be used only to produce manufactured dairy products.

Through the price support program the federal government supports the price of milk sold for manufacturing uses by offering to purchase all quantities of butter, cheese, and nonfat dry milk that are offered, at specified prices. The government purchase prices, which include allowances to cover processing costs and profit, are derived from a planned support price for milk. While the price support program is intended to establish a floor on grade B milk prices, it does not always prevent market conditions from causing the price to go below that floor. Periodically, market conditions can cause the price to rise above that floor.

Our 1988 report on milk marketing orders was a policy analysis report that discussed the effect of milk marketing orders on the milk surplus problem and how the orders might be changed to reduce the incentives for excessive milk production, and recommended steps to lessen federal involvement in regulated milk pricing.[1] The report suggested the steps be made incrementally to allow time for the dairy industry to adjust and

[1] Milk Marketing Orders: Options For Change (GAO/RCED-88-9, Mar. 21, 1988).

for the government to monitor such adjustments to ensure that unanticipated adverse effects did not occur. In contrast, this report evaluates alternative technical bases for pricing most milk nationally within the current or modified system for regulating milk.

Background

Federal milk marketing orders apply only to grade A milk sold in areas of the United States where producers have voluntarily adopted them. The orders set forth the minimum price to be paid producers, acceptable milk marketing practices, and terms and conditions of sale. The USDA's Agricultural Marketing Service administers the federal order program in 11 market areas (as of March 1989), which represent more than 80 percent of the grade A milk marketed in the United States.

The federal milk marketing orders set monthly minimum prices for grade A milk according to how the milk is used. Milk uses are generally divided into three classes:

- Class I milk, the highest priced milk, is milk used for fluid consumption. Class I prices apply to milk sold as whole, skim, and low-fat milk; milk drinks; and buttermilk.
- Class II milk is milk used for fluid cream and to manufacture soft products, such as ice cream, cottage cheese, and yogurt.
- Class III milk is milk used in the manufacture of hard products, such as cheese, butter, and nonfat dry milk.[2]

The M-W price becomes the class III price and is the basis for determining class I and class II prices. The minimum price paid to producers is based on each order's class prices and on the amount of milk used for each class in a marketing order during a month. This minimum price is called the blend price. Plants must pay at least the blend price, adjusted for plant location and the producer's butterfat test.[3] (See ch. 2 for further discussion of butterfat tests.)

The grade A milk produced outside the federal milk marketing orders represents about 20 percent of U.S. grade A milk production. For example, California, with about 14 percent of total U.S. grade A milk production, has chosen not to become part of the federal order system and has adopted state milk pricing regulations.

[2]In orders that have only two classes of milk, all milk except fluid milk is class II.

[3]Cooperatives are exempt from paying the blend price.

M-W Price Calculation

Prices used to calculate the M-W price are gathered through two different reports submitted monthly by plants that purchase grade B milk in Minnesota and Wisconsin. All grade B plants within both states are requested to provide the first report. This report contains "base month" (previous month) price and quantity data used to calculate the previous month's average price, which provides a bench mark for the M-W price. The second report, provided by a sample of plants in Minnesota and a sample of plants in Wisconsin, provides price and quantity data on grade B milk purchased in the first half of the current month. To the extent that plants provide these data, these reports also provide an estimate for the last 2 weeks in the month. Plants need to pay producers twice a month to qualify as a sample plant. The estimate of price change from the base month to the current month, derived from these two reports, becomes the basis for the estimated monthly change in the M-W price.

In addition to the data reported by the base and current month reporting plants, USDA uses various other data to determine the M-W price each month, such as

- historical trend data showing the average changes in the M-W price and the butterfat test from the base month to the current month;
- recent trend data on cheddar cheese, butter, nonfat dry milk, and whey powder price changes; and
- current information on the dairy product market.

The M-W price is calculated by weighting the reported data by type of product and size of plant, and summarizing the data. Current month price changes are applied to the base month average prices to estimate the current month price. The Minnesota Agricultural Statistics Service calculates a price for Minnesota, and the Wisconsin Agricultural Statistics Service calculates a price for Wisconsin. The price calculation in each state requires judgment in analyzing the data reported, historical trends, and current market patterns. These prices are forwarded to the National Agricultural Statistics Service in Washington, D.C. The national service reviews the data for consistency and reasonableness and works with the state offices to resolve any questions.

Subsequently, the two prices are combined and weighted to arrive at an average two-state price. The average price at the reported butterfat level and a price converted to 3.5-percent butterfat content are released by the national service. The converted price is the M-W price, which is

the class III price used in all three-class federal orders and is the class II price in all two-class federal orders.

Objectives, Scope, and Methodology

Senators Patrick Leahy, Rudy Boschwitz, and Bob Kasten requested that we determine whether the M-W price is a reliable and appropriate adjuster of milk prices and whether it needs to be improved, and develop recommendations for improving the pricing system for milk used for manufacturing, if warranted.

To accomplish our objectives, we reviewed the literature on milk pricing in the United States and, more specifically, the M-W system to determine what issues the experts in the industry have addressed. We reviewed studies prepared by government, industry, and academic groups.

To determine how the M-W system operates, we reviewed the M-W data collection and calculation records of the National, Minnesota, and Wisconsin Agricultural Statistics Services. We also discussed the M-W system's operation with officials of these agencies, the USDA's Agricultural Marketing Service, and the market administrators of the Upper Midwest and Chicago Regional Federal Orders.

To obtain industry views on the M-W issue, we discussed the M-W price mechanism with officials of 14 milk plants and 2 multi-plant cooperatives in Minnesota and Wisconsin. These organizations were selected judgmentally to obtain a mix of product type, size of operation, and location in the two states.

To obtain an indication of future trends in grade B milk production in Minnesota and Wisconsin, we used a mail-in questionnaire to survey active grade B milk producers in Minnesota and Wisconsin. This survey was conducted between October 1988 and January 1989. We requested producer plans for continuing grade B production at the end of 1 year and at the end of 5 years. In the questionnaire sent to the Wisconsin producers, we also requested views on the impact of the recent increased frequency of grade B farm inspections and proposed tightening of grade B quality standards. To identify grade B milk producers, we obtained computerized files from the two states that were current as of September 1988 and used these to randomly sample 650 producers from each state. We sent follow-up questionnaires to encourage responses from individuals not responding to the original mailing. Survey response rates were 80 percent for Minnesota producers and 83 percent for Wisconsin producers.

All sample surveys are subject to sampling error. That is, sample results can differ from results that would be obtained if the entire population responded to the questionnaire. We selected sample sizes large enough to ensure that sampling error for estimates of percentages did not exceed 5 percent at the .95 level of confidence.

We were assisted in our analysis of the M-W price series and its possible alternatives by three agricultural economists: Dr. Robert Cropp, Dr. Edward Jesse, and Dr. Ronald Knutson. Dr. Cropp is Dean of the College of Agriculture at the University of Wisconsin-Platteville and Agricultural Marketing Specialist with the Cooperative Extension Service, University of Wisconsin-Extension. Dr. Jesse is Professor of Agricultural Economics and Chairman of the Agricultural Economics Department at the University of Wisconsin-Madison, and Agricultural Policy Specialist with the Cooperative Extension Service, University of Wisconsin-Extension. Dr. Knutson is Professor of Agricultural Economics, Extension Economist, and Director of the Agricultural and Food Policy Center at Texas A&M University, formerly Administrator of the Farmer Cooperative Service, and Chairman of the 1972 USDA Milk Pricing Advisory Committee. All three consultants have extensive experience with dairy marketing and policy matters.

At the conclusion of our review, we asked four agricultural economists (knowledgeable of dairy industry operation) to review our draft report: Dr. Bruce Gardner, former Professor of Agricultural and Resource Economics at the University of Maryland; Dr. James Gruebele, Dairyman's Coop Creamery Association of Tulare, California; Dr. Harold Harris, Jr., Professor of Agricultural Economics at Clemson University; and Dr. Robert Jacobson, Professor of Agricultural Economics at Ohio State University. We considered their comments, and this report incorporates some changes made as a result of their review. However, this review role should not be interpreted to imply that these reviewers necessarily concur with all of the findings, conclusions and recommendations contained in this report.

We conducted our review between May 1988 and January 1989 in accordance with generally accepted government auditing standards.

The M-W Pricing Mechanism Needs Replacement

The decline in grade B milk production and in the number of grade B purchasing plants raises questions about the reliability of the grade B price as the basis for valuing over 70 percent of the nation's milk. However, we cannot quantify exactly when the decline will be significant enough to negate the M-W price series' usefulness.

There are also other issues that could result in the current M-W price mechanism not accurately reflecting the price of milk used in manufacturing on a national basis. For example, the M-W plant samples may have become less representative of all grade B purchasing plants in Minnesota and Wisconsin, and most plants that are willing to report are currently in the samples. Additionally, two factors not accounted for in the M-W price calculation may distort the M-W price. First, plants subsidize the cost of hauling milk from the farm to the plant, and this subsidy is not part of the milk price reported to USDA. Second, Minnesota and Wisconsin grade B plants are changing their method of pricing grade B milk to include milk components other than butterfat, such as protein. However, while the M-W price is adjusted to a standard butterfat content, it is not adjusted for protein levels. While our discussions with industry officials indicated there are other possible weaknesses with the M-W price, we only discuss those weaknesses for which we have adequate evidence.

Modifications could be made to address weaknesses such as those related to hauling subsidies and multiple-component pricing. However, the critical issue is the limited life of the M-W price because of the declining grade B production and number of grade B purchasing plants, and these weaknesses cannot be corrected. Rather than making short-term modifications, the time remaining could be better spent developing and testing possible replacements.

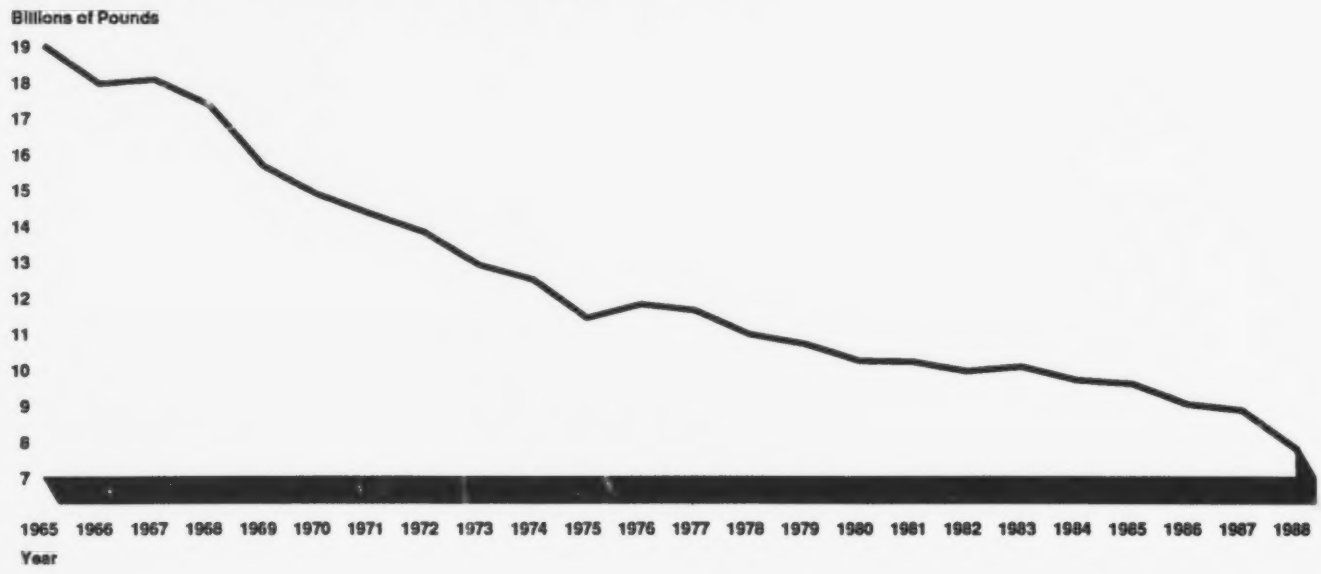
Declining Grade B Milk Production and Number of Purchasing Plants Are Leading to an Obsolete M-W Price Series

The use of grade B milk prices for fluid milk pricing assumes that the M-W price represents actual market conditions. However, the annual volume of grade B milk produced nationally and in Minnesota and Wisconsin has been declining over the past 23 years. Further, the number of grade B purchasing plants has decreased. Therefore, the price paid for grade B milk is becoming a less reliable indicator of the price of milk used in manufacturing. The decline in grade B production can be attributed to such factors as increased financial incentives that encourage producers to convert to grade A milk production and more stringent standards for milk quality and dairy facility inspections. This decline is expected to continue. However, we are not able to specify at what point in time this decline will render the M-W price unreliable.

Grade B Production Declines

Production of grade B milk in Minnesota and Wisconsin has declined over 50 percent since 1965. As figure 2.1 shows, between 1965 and 1975 grade B production in the two states decreased sharply. Since 1977 production has continued to show a downward trend.

Figure 2.1: Grade B Milk Production in Minnesota and Wisconsin, 1965-88



As shown in table 2.1, Minnesota's grade B production declined from about 9 billion pounds in 1965 to about 3 billion pounds in 1988. Similarly, Wisconsin's grade B production declined from about 10 billion pounds in 1965 to about 5 billion pounds in 1988.

Table 2.1: Comparison of Minnesota, Wisconsin, and U.S. Grade B Milk Production, 1965, 1988

Pounds in billions

	1965			1988		
	Pounds grade B milk	Percent of U.S. grade B milk[a]	Percent of state's total milk	Pounds grade B milk	Percent of U.S. grade B milk[a]	Percent of state's total milk
Minnesota	9	22	84	3	20	28
Wisconsin	10	27	57	5	35	20
Total	**19**	**49**	**67**	**8**	**55**	**22**
Total U S	39	100	[b]	14	100	[b]

[a]Percentages were calculated using unrounded numbers

[b]Not applicable

Source: Milk Production, Disposition and Income, annual summaries, 1965 and 1988, USDA

Reasons for Grade B Decline

The decrease in grade B production can be attributed to a number of factors, including financial rewards for switching to grade A production and more stringent milk quality standards and inspection procedures for dairy facilities.

Federal milk marketing orders establish higher prices for milk used for fluid purposes. Grade A producers, therefore, usually receive a higher price than grade B producers. The cost of producing grade B milk is approaching the cost of producing grade A milk. Consequently, the incentive for grade B producers to upgrade their facilities to grade A has increased.

More stringent milk quality standards and more frequent inspections of dairy facilities at grade B farms have caused some grade B producers either to upgrade their facilities to grade A or to cease production. In 1983, Minnesota enacted legislation that increased grade B quality standards and also directed that grade B producers' facilities be inspected annually. Following implementation of this legislation, the reduction in grade B production and in the number of grade B producers accelerated. In 1988, Wisconsin also implemented new inspection procedures for grade B dairy farms that called for annual inspections of grade B producers' facilities. Further, Wisconsin implemented higher quality standards for grade B milk, effective August 1, 1989.

Indications of Diminished Future Production

Past and current trends indicate that production of grade B milk will continue to decline. Total combined annual grade B milk production in Minnesota and Wisconsin declined every year but one between 1978 and 1988, and the average annual rate of decline for these 10 years was about 3 percent for the two states. Minnesota grade B production decreased by about 4 percent per year and Wisconsin grade B production declined about 3 percent per year. We calculate that if these trends continue, grade B production in the year 2000 will be about 1.9 billion pounds for Minnesota and about 3.4 billion pounds for Wisconsin, or a total of 5.3 billion pounds, compared with 7.9 billion pounds in 1988. This decline would represent a production decrease of about 72 percent between the years 1965 and 2000.

Our questionnaire results suggest that past trends may continue. About 3 percent of both Wisconsin and Minnesota grade B producers reported that they are likely to leave grade B dairying by August 1989. Also, about 15 percent of Wisconsin's and about 13 percent of Minnesota's grade B producers told us that they no longer plan to be producing grade B milk at the end of 5 years, or in 1993.[1]

State agriculture agency officials in both states also report that grade B production will continue to decline. The Wisconsin Department of Agriculture, Trade and Consumer Protection has estimated a significant decrease in the number of grade B farms between 1988 and 1991. Wisconsin estimated that there were about 13,400 grade B farms operating in Wisconsin in March 1988. It estimates that by 1991 it may have about 4,500 grade B farms. Officials of Minnesota's Department of Agriculture and the Upper Midwest Order told us they believe the decreasing trend in grade B milk production in Minnesota will continue in the future. Because new milk producers are more likely to be grade A producers, and because grade B producers continue to convert to grade A, Wisconsin and Minnesota agriculture officials told us that the loss in grade B production is likely to be permanent.

[1]The sampling errors for both Wisconsin and Minnesota were .02 for those leaving dairying in 1989 and .03 for those leaving in 5 years.

Declining Number of Grade B Milk Purchasing Plants in Minnesota and Wisconsin

Fewer plants now purchase grade B milk than when the M-W price was established in 1961. In the early 1960s, there were about 1,325 plants that purchased grade B milk in Minnesota and Wisconsin (about 425 in Minnesota and about 900 in Wisconsin). By 1989, this number had declined to about 315, with about 80 in Minnesota and about 235 in Wisconsin. This decline is attributable to plants going out of business and consolidations.

We cannot determine when the level of grade B production and number of grade B milk purchasing plants will be too small to generate a valid, market-determined M-W price. However, grade B production and the number of purchasing plants have declined, and we have no assurance that the level of production is sufficient to provide a reliable indicator of the value of milk used in manufacturing.

M-W Samples May Have Become Less Representative of Grade B Purchasing Plants

In order to accurately reflect the value of milk used in manufacturing, the samples of plants used to calculate the M-W price should be as representative of all Minnesota and Wisconsin grade B purchasing plants as possible. However, changes in the samples in recent years may have made these samples less representative of all plants than they were at one time.

When the M-W system was adopted in 1961, about 560 plants in Minnesota and Wisconsin, out of a total of about 1,325 plants, reported the quantity of grade B milk purchased, its butterfat content, and amount paid for the previous, or base month. Base month data were provided by 260 plants in Wisconsin, purchasing about 40 percent of all grade B milk in the state, and 300 plants in Minnesota, purchasing about 70 percent of that state's grade B milk.

Additionally, to obtain the current month's quantity and price data on grade B milk purchases, two statistical samples were used, one each in Minnesota and Wisconsin, for a total of 100 grade B milk plants. Each sample plant provided data on milk purchases for the base month and for the first half of the current month. USDA used this information to calculate the price change between the base month and the current month.

Differences in plant size, geographic distribution, and type of products produced were considered in the "current month" sample designs. Minnesota's sample had 36 plants and Wisconsin's 64. Plants were selected from the northern, central, and southern geographic areas of each state.

Minnesota plants were of two types—those producing butter and its by-products, and other plants. Wisconsin plants were grouped in four categories—cheese, butter and by-products, condensed products, and varied products.

By 1971, the current month samples had become outdated because plants went out of business, became ineligible, or decided not to participate. Therefore, a new sample was drawn for each state. USDA calculated that a total of 110 plants was necessary to estimate the average pay price per hundredweight within 5 cents for each of the two states with 95-percent probability. Wisconsin was represented by 70 plants and Minnesota by 40.[2]

Since 1971, numerous plants have dropped out of the samples because they have closed, consolidated, changed producer payment schedules so they no longer meet M-W price reporting requirements, or decided not to continue reporting prices for the M-W price. Between 1971 and July 1989, the samples decreased from 110 to 71 plants. In July 1989, this sample of 71 plants compares with a total of about 315 plants in Minnesota and Wisconsin purchasing grade B milk. In the past, USDA has attempted to replace plants that cease to report. USDA officials told us that these replacement plants were not randomly selected and that almost all plants that qualify and are willing to report are already in the samples.

Because of the way that the samples have changed since 1971, they may have become less representative of all plants purchasing grade B milk in Minnesota and Wisconsin. Therefore, the M-W price may not reflect the value of milk used in manufacturing as well as it once did, and further sample changes may make matters worse.

Hauling Subsidies Distort the M-W Price

Hauling subsidies are not accounted for in the M-W price calculation. The M-W price is intended to represent the value of grade B milk at the receiving plant. Traditionally, milk producers in most places have paid the cost of hauling milk to the plant. However, Upper Midwest milk plants normally pay part of the cost of delivering the milk to the plant. These subsidies provide additional revenue to producers, and therefore we believe these additional returns should be added to the price of milk

[2]Sixty cheese plants, 5 multi-product plants, and 5 butter plants in Wisconsin, and 30 butter plants, 5 cheese plants, and 5 multi-product plants in Minnesota.

reported monthly by the plants. The failure to include these subsidies in the reported M-W price understates the true price of grade B milk.

For example, assume that a plant pays $10.90 per hundredweight of milk. Additionally, the plant subsidizes $0.25 per hundredweight of hauling costs. Under the current situation, a reporting plant would report $10.90 for M-W pricing, whereas the true cost of milk to that plant is $11.15. This situation would contribute to the understatement of the M-W price by $0.25.

Reporting on 1985 milk-pricing practices in Wisconsin, a 1987 study found that 20 out of 156 firms provided free, or fully subsidized, hauling.[1] The study did not gather information on whether or to what extent the other firms subsidized hauling. In addition, we discussed hauling charges with officials of 16 Minnesota and Wisconsin milk plants and multi-plant cooperatives, and 11 of the 16 told us that they subsidize hauling. Officials of seven plants told us they subsidize hauling from $0.02 to $0.23 per hundredweight. One plant official told us that his firm provided free hauling, but he could not determine its amount. Officials of three other plants told us they subsidize hauling but were unable to provide us with the amount of the subsidy.

Multiple-Component Pricing Affects the Accuracy of the M-W Price

Milk pricing in Wisconsin and Minnesota is evolving from a pricing system based on volume and butterfat content (the higher the butterfat content, the higher the price) toward a system that also values other milk components, such as protein. The M-W pricing procedure adjusts the reported M-W price from the reported butterfat content to a 3.5-percent standard, but it does not adjust for variations in other components such as protein. Because plants consider these factors, and the M-W mechanism does not, the adjusted price of manufacturing milk is generally overstated.

Multiple-Component Pricing

An increasing number of Wisconsin and Minnesota grade B plants use multiple-component pricing rather than the traditional volume-plus-butterfat pricing. As of April 1989, about 70 percent of the 74 sample plants were using multiple-component pricing. With multiple-component pricing, nonfat milk solids and butterfat are separately priced. In Wisconsin, milk is usually tested for protein as well as butterfat. Producers'

[1]Will Hughes and Ed Jesse, Producer Milk Pricing Practices in Wisconsin, 1985, Marketing and Policy Briefing Paper No. 14, University of Wisconsin-Extension, April 1987.

prices are adjusted by a butterfat differential, calculated according to producers' average butterfat test relative to the 3.5-percent industry standard, and most are also eligible to receive a protein premium based on their protein test relative to some base level.[1] Minnesota bases its price on butterfat and total solids-not-fat rather than just protein. Solids-not-fat refers to all nonfat milk solids—protein, lactose, and ash. However, only the protein level is subject to significant variation. For purposes of the following discussion, we will use the term protein when referring to the solids-not-fat component of milk.

Plants reporting grade B milk prices provide the total value of milk received, including protein premiums paid, and the average butterfat test for all milk. The average reported grade B price is adjusted downward for butterfat content above 3.5 percent (to account for the premium) and upward for content below 3.5 percent (to account for the discount). Similar adjustments are not made for varying protein content levels.

Effects on the M-W Price

Generally, milk that tests high in butterfat will also have a high protein level. However, the M-W price is not adjusted to reflect variations in the protein level, as it is for butterfat. Consequently, the M-W price, adjusted to 3.5-percent butterfat, is generally overstated because it is not adjusted for the protein premium.

The industry standard for butterfat content is 3.5 percent. The average butterfat test for all milk marketed under federal orders in 1987 was 3.66 percent. There is no similar industry standard for protein content. However, milk with a 3.5-percent butterfat content, on average, contains about 3.15-percent protein.

Table 2.2 illustrates how the milk price is affected when it is adjusted for butterfat content but not for protein content. It assumes a butterfat differential of $0.16 per point (one-tenth of 1 percent) of butterfat above or below the 3.5-percent standard and a protein premium of $0.10 per point of protein above 3.15 percent. In the illustration the butterfat content is 3.8 percent—or above the 3.5-percent standard—and the

[1]Note that the protein "differential" is typically asymmetric: A premium is paid for protein above some base level, but deductions for protein tests below the base are uncommon.

reported M-W price is adjusted for this premium but not for the protein premium.[5]

Table 2.2: Effect of Adjusting for Butterfat but Not for Protein

Dollars per hundredweight	
Milk-pricing factors	**Percentage**
Actual butterfat composition	3.80
Actual protein composition	3.27
Price calculation	**Dollars**
Base price	$11.00
Butterfat differential payment	0.48
Protein premium	0.12
Reported M-W price at reported butterfat test	11.60
Butterfat adjustment to 3.5 percent	(0.48)
Butterfat adjusted M-W price to 3.5 percent	$11.12

The butterfat-adjusted M-W price accounts for the added value of butterfat in the milk testing at 3.8 percent by the adjustment of $0.48. However, the adjustment does not account for the fact that 3.8-percent butterfat milk has more protein than milk testing at 3.5 percent. The additional protein has value that was recognized by the plant in paying the producer—$0.12 in this case. Consequently, the reported price for M-W price purposes in this example is overstated by $0.12.

The extent to which the adjusted M-W price is overstated by the payment of protein premiums cannot be easily measured. However, the effect could increase with greater use of multiple-component pricing.

Conclusions

The most critical issue concerning the reliability of the M-W price is the declining level of grade B production and of the number of grade B purchasing plants in Minnesota and Wisconsin. Because of these factors, we have no assurance that the current M-W price is a reliable indicator of the value of milk used in manufacturing. When grade B production and the number of purchasers reaches so low a level that the M-W price will not serve as a valid indicator of the price of milk used in manufacturing, the other issues concerning reliability become irrelevant. Each of the remaining concerns about the M-W price has an impact on the reliability

[5]The protein test shown is the average for the specified butterfat test reported. V. Halverson and H. P. Kyburz, Upper Midwest Marketing Area: Analysis of Component Levels in Individual Herd Milk at the Farm Level, 1984 and 1985, Staff Paper 86-01, Upper Midwest Marketing Area, Dairy Division, Agricultural Marketing Service, USDA, March 1986.

of the M-W series as a pricing mechanism. Modifications could be made to the M-W pricing mechanism to correct some of the deficiencies discussed. However, any of these modifications are short-term solutions only, and therefore we do not believe they represent viable options.

Consequently, it is important for USDA to be prepared to develop and test a replacement for the current M-W price series as soon as possible. Chapter 3 discusses several options we believe should be considered.

Alternatives to the M-W Should Be Developed and Tested

Our 1988 milk marketing report recommended steps to lessen federal involvement in regulating milk prices. However, as long as prices are regulated, a mechanism is needed to set them. Before the M-W price becomes invalid, an alternative pricing mechanism should be developed and tested. We and our consultants identified five possible alternatives that are based on methods of milk pricing currently in use or variants of methods suggested in the literature. While there may be other possible alternatives, we believe the five we identified are the primary viable alternative pricing mechanisms under the current marketing order system and under some of the proposed modifications to that system outlined in the 1988 milk marketing report. These alternatives should not be viewed as mutually exclusive.

We did not attempt to predict (1) how much of a differential would exist between the M-W price and price levels resulting from the various alternatives or (2) the impact on the retail price of milk or milk products. However, any of the five alternatives we evaluated could be phased in over time. They could be adjusted to ensure that the net price to the producer would not immediately change dramatically as a result of changing from the M-W price series to a new price series.

Our analysis of the following alternatives indicates that the first and the third alternatives best incorporate most of the characteristics necessary for a pricing mechanism that generates a representative milk price within the regulatory system.

- A regulated grade A manufacturing price series that would operate like the M-W price series, except that grade A manufacturing milk prices under milk marketing orders, along with grade B milk prices, would be used to establish a pricing base. Such a base should generally reflect market conditions for milk.
- A deregulated grade A price series that would also operate like the M-W price series, except that to establish a pricing base that should reflect market conditions, grade A manufacturing milk prices would be collected from selected plants removed from federal milk marketing orders and used along with grade B milk prices.
- A product formula that would derive milk's value from dairy product prices.
- An economic formula that would use broad economic factors, such as production costs and the Consumer Price Index, to establish milk price changes.
- An administratively determined price that would be set through an administrative process, such as a committee, hearing, or panel.

This chapter discusses these alternatives and examines whether they exhibit characteristics that we believe would be desirable in a price series. Additionally, we examined the current M-W price series for these characteristics. A technical discussion of each alternative is included in appendix II.

These alternatives could work equally well under the present marketing order system or under a marketing order system incorporating changes discussed in our 1988 report.[1]

Desirable Characteristics of a Price Series

To evaluate possible replacements for the M-W system, we and our consultants established five characteristics desired for a federal order pricing system. These characteristics may not be all-inclusive, and they are not mutually exclusive. We believe that an alternative that reflects these characteristics will best achieve the federal interest in an orderly and fair system for pricing milk. A mechanism should do the following:

- Generate a price that reflects national prices of manufactured dairy products. The price paid for milk used to manufacture dairy products should reflect, to the maximum extent possible, the national market prices of butter, nonfat dry milk, and cheese. Since the prices of manufactured products are determined in a national market, there should be a single national price for milk used in manufacturing.[2] If milk prices established by the pricing mechanism fail over the long run to reflect product prices, milk plants could realize extraordinary profits or losses.
- Generate a price that reflects national supply-demand conditions for milk used for manufacturing. Grade A milk supplies used for fluid purposes have a higher value than those used for manufacturing. As the need for fluid milk changes, the amount of grade A milk available for manufacturing uses must shift to meet this change. For example, in the fall of the year, when the demand for fluid milk, relative to the grade A milk supply, increases, the price of milk used in manufacturing often rises above the level indicated by product prices alone. It is important

[1]Some of these changes include adopting a system for establishing marketing order minimum prices for fluid milk using more basing points; removing restrictions that effectively prevent reconstituted milk from moving between locations to satisfy local fluid milk deficits; and eliminating price differentials that establish higher minimum prices for fluid milk as the distance from Eau Claire, Wisconsin, increases.

[2]This assumption does not consider transportation costs for manufactured dairy products and differences in processing costs between regions. However, costs of processing and transporting butter, nonfat dry milk, and cheese are small relative to product value.

that national supply and demand conditions for milk, as a whole, be reflected in the price of milk used in manufacturing.

- Generate a price that is not significantly affected by local conditions. Pricing practices that are unique to a particular locality or region should not influence the pricing of milk at the national level. For example, if the mechanism uses a sample of plants from Wisconsin, it should adjust for any aspects of pricing milk that are unique to that area. In the absence of such adjustments, the mechanism would generate a distorted national price.
- Provide a valid mechanism for setting milk prices over the long term. The mechanism chosen to set the values for milk used in manufacturing should have long-term duration because the industry needs a consistent and reliable pricing system for making future plans. A mechanism with long-term duration also supports the marketing goal of market stability.
- Be automatic and self-adjusting. The milk industry, like all of agriculture, is dynamic and volatile. Price adjustments are best accomplished by mechanisms that respond automatically when conditions change. Such mechanisms contrast with those that require periodic adjustments in the pricing mechanism, and/or decisions by individuals and policymakers. Such adjustment decisions can be delayed by concerns about setting the "wrong" price or by bureaucratic approval processes.

Current M-W Price Series

The following evaluation of the current M-W system with respect to our desired milk-pricing characteristics is based on the discussion in chapter 2. The current M-W price series generally reflects national prices of manufactured dairy products and is automatic and self-adjusting. However, it has gradually become a less reliable indicator of national supply-demand conditions for milk used for manufacturing, is affected by local conditions, and does not provide a valid mechanism for setting milk prices over the long term. In the following section we discuss how well the M-W price series reflects the characteristics we identified.

Reflects National Prices of Manufactured Dairy Products

The current M-W price series generally reflects national prices of manufactured dairy products because Minnesota and Wisconsin have been, and continue to be, the primary center of dairy product manufacturing. These states produce about 25 percent of the nation's total milk supply. Because reporting plants use grade B milk in manufacturing, the prices they pay reflect the value of the milk for these purposes. As grade B volume continues to decline, the M-W price will be less representative of national product prices. However, because the samples of reporting

plants may no longer be representative, we have no assurance that the M-W price is representative of prices paid for manufacturing milk.

Reflects National Supply-Demand Conditions for Milk Used for Manufacturing

Because Wisconsin and Minnesota are a major milk-producing section of the country, they serve as a primary supply of reserve grade A milk for deficit fluid markets. When the national milk supply-demand situation tightens, shortages of grade A milk can occur in primary fluid markets. Grade A milk is shipped to deficit fluid markets from Wisconsin and Minnesota, which lowers the supply of milk available in these two states for manufacturing. As a result, the prices of both grade A milk for manufacturing and grade B milk increase. When fluid milk needs can be met locally, the volume of grade A milk available for manufacturing in reserve supply areas increases and prices ease. Thus, the M-W price reflects national milk supply-and-demand conditions for grade A fluid milk and the competition between milk utilized for fluid and manufacturing purposes. However, as grade B milk production declines, the M-W price becomes less reliable as an indicator of national supply-demand conditions for milk. In addition, local conditions, such as hauling subsidies and multiple-component pricing, may affect the degree to which the M-W price meets this characteristic.

Generates a Price That Is Not Significantly Affected by Local Conditions

Since the M-W price series is based on prices in two states, any conditions that are unique to those states and affect milk prices would distort the M-W price from a national perspective. For example, local conditions, such as hauling subsidies and multiple-component pricing in the Minnesota and Wisconsin dairy industry, distort the M-W price. However, the M-W price could be adjusted for these particular factors.

Provides a Valid Mechanism for Setting Milk Prices Over the Long Term

The duration of the M-W price is limited by the continuing decline in grade B milk production and the number of grade B purchasing plants.

Automatic and Self-Adjusting

Because the M-W price is based on actual reported pay prices, it automatically adjusts to changing conditions. However, as we previously mentioned, some element of judgment enters into the M-W price calculation.

Regulated Grade A Manufacturing Price

Generally, this alternative is similar to the M-W price, except that it would use prices paid for grade A milk used in manufacturing in combination with prices paid for grade B milk. This alternative might be considered because there are a number of regulated grade A manufacturing plants in the Upper Midwest that compete heavily for milk supplies, often paying a price that is higher than minimum prices required by the order.

Grade A prices could be reported by a representative group of manufacturing plants under the Chicago Regional and Upper Midwest Orders, which include most of Minnesota and Wisconsin. The Chicago Regional and Upper Midwest Orders are used in this alternative because those areas have a high concentration of plants that manufacture milk products and use a high percentage of grade A milk for manufacturing dairy products. While other parts of the country could be considered, such as the Northeast, the concentration of plants is less, and the portion of grade A milk used for manufactured dairy products is lower than in the Upper Midwest. There are order-regulated grade A dairy plants in the Upper Midwest that use all or most of their grade A milk in manufacturing. The reporting plants could be selected on the basis of their manufacturing use. For example, plants with no less than 90-percent manufacturing use might be chosen. This criterion would allow an adequate number of plants and a large enough volume of milk to ensure a representative price.

Selected grade A plants would be exempted from paying minimum order blend prices but would continue to be subject to other order regulations. These plants would be requested to report the price paid to producers for grade A milk. USDA would adjust this price to remove the value added by the portion of milk used for fluid purposes. Additionally, this price would be adjusted for hauling subsidies and multiple-component pricing. This adjusted price in combination with the grade B price would become the class III price.

In the following section we discuss how well this alternative reflects the characteristics we identified.

Reflects National Prices of Manufactured Dairy Products

The regulated grade A manufacturing price alternative would generally reflect national prices of manufactured dairy products. It would represent an improvement over the current M-W price because the volume of grade A and grade B milk used in manufacturing and the number of plants purchasing this milk are greater than under the M-W price series.

Reflects National Supply-Demand Conditions for Milk Used for Manufacturing

The regulated grade A manufacturing price alternative reflects national supply-demand conditions for milk used for manufacturing because it is based on a large volume of milk and a large number of plants purchasing milk for manufacturing. The Upper Midwest is the primary supplier of fluid milk to other market areas during periods of shortage, and therefore, the price in this region responds to changes in market conditions nationwide. Because this price series is based on a significantly larger volume of milk and more plants purchasing milk for manufacturing than the M-W series, it is a better reflection of market conditions nationwide than the current M-W price. The regulated grade A manufacturing price series would also more accurately reflect competitive pressures from the fluid milk market because grade A milk is used to meet fluid shortages in other parts of the country.

Generates a Price That Is Not Significantly Affected by Local Conditions

As in the case of the current M-W price series, any conditions that are unique to the two milk marketing orders used in the regulated grade A manufacturing price series and affect milk prices could distort the series price. Assuming adjustments for local conditions, such as hauling subsidies and multiple-component pricing, this alternative would not be significantly affected by local conditions. While this alternative is based on prices in two marketing orders, these orders represent the highest concentration of milk used in manufacturing.

Provides a Valid Mechanism for Setting Milk Prices Over the Long Term

As long as the Minnesota-Wisconsin region remains the primary milk production region, there would be a large volume of milk from which to determine values for milk used in manufacturing. Currently, the volume of grade A milk in Minnesota and Wisconsin that is used in manufacturing is increasing. Therefore, the regulated grade A manufacturing pricing mechanism will have greater duration than the current M-W price.

Automatic and Self-Adjusting

Because the regulated grade A manufacturing price series would be based on actual reported pay prices, it would be automatic and self-adjusting. However, as is the case with the current M-W price series, the sample would need to be reviewed periodically to ensure its representativeness, and some element of judgment would be likely to enter into the price calculation.

Deregulated Grade A Manufacturing Price

Another alternative to the present M-W series would be a price series based on the prices of milk used for manufacturing, as reported by selected grade A manufacturing plants that would be deregulated (no longer permitted to operate under the federal milk marketing orders). These reported prices would be in addition to the prices reported by grade B plants. The selected plants would be removed from the Upper Midwest and Chicago Regional Orders because their milk is not needed to fulfill the markets' fluid needs. Such changes would require hearings followed by a major restructuring of the two marketing orders. (For a discussion of this restructuring, see app. II.) The Chicago Regional and Upper Midwest Orders are used because those areas have a high concentration of plants that manufacture milk products and use a high percentage of grade A milk for manufacturing dairy products.

Selected grade A plants would be requested to report the price paid to producers for milk used in manufacturing. USDA would analyze these data, along with grade B prices, and use them as the basis for setting the class III price. This alternative should be adjusted for M-W deficiencies, such as hauling subsidies and multiple-component pricing.

This alternative might be viewed negatively by producers because certain producers would be treated unequally by not being allowed to participate in the marketing orders. In the following section we discuss how well this alternative reflects the characteristics we identified.

Reflects National Prices of Manufactured Dairy Products

Deregulating a number of grade A manufacturing plants in the Upper Midwest and Chicago Regional Orders would significantly increase the volume of unregulated milk. Since this alternative uses a large volume of unregulated milk that is purchased for manufacturing dairy products, it should reflect national prices of manufactured dairy products.

Reflects National Supply-Demand Conditions for Milk Used for Manufacturing

Like the regulated grade A alternative, this alternative reflects national supply-demand conditions for milk used for manufacturing. It is based on a large volume of milk in a generally competitive market, and the Upper Midwest is the primary supplier of fluid milk to other market areas during periods of shortage. Therefore, the price in this region responds to changes in market conditions nationwide. Also, this price series is based on a much larger volume of milk and more milk purchasing plants than is the M-W series. Therefore, it is a better reflection of market conditions nationwide. Finally, the deregulated grade A manufacturing price series would more accurately reflect market conditions

in the fluid milk market because grade A milk is used to meet fluid shortages in other parts of the country.

Generates a Price That Is Not Significantly Affected by Local Conditions

As in the case of the current M-W price series, any conditions that are unique to the Upper Midwest area used in the price series and affect milk prices would distort the series price. Assuming adjustments for local factors such as hauling subsidies, this price series would not be significantly affected by these local conditions. While this alternative is based on prices in two orders, these orders represent the highest concentration of milk used in manufacturing.

Provides a Valid Mechanism for Setting Milk Prices Over the Long Term

As long as the Minnesota-Wisconsin region remains the primary milk production region, there would be a large volume of milk from which to determine values of milk used in manufacturing. This alternative would be based on about three times as much milk volume, or about 25 billion pounds of grades A and B milk, compared with the 1988 grade B volume of 8 billion pounds. Therefore, the deregulated grade A manufacturing pricing mechanism would have longer duration than the current M-W series.

Automatic and Self-Adjusting

Once established, this system would be similar to the M-W series in terms of its ability to self-adjust because it is based on actual pay prices. However, some element of judgment would be likely to enter into the series' price calculation.

Product Formulas

Product formulas rely on the price of manufactured products to derive a price for milk used to manufacture those products, whether grade A or grade B milk. This alternative contrasts with the previously discussed alternatives that use an actual reported pay price.

For example, in a cheese formula wholesale prices for cheese could be obtained from published reports or collected from the marketplace. Normal product yields (for example, the number of pounds of cheese that can be made from a hundredweight of milk) would be applied to these product prices to establish the product value per hundredweight of milk. Where applicable, by-product values would be added to primary product value to obtain gross plant revenue per hundredweight of milk

processed. Finally, an appropriate allowance for plant profit and manufacturing costs (make allowance) would be subtracted from gross revenue to derive the value of milk used in manufacturing.

Product formulas are simple in a mechanical sense. Once the formulas are constructed, little judgment is necessary. They also convey a sense of market fairness—dairy producers should be rewarded for what their milk ultimately sells for as manufactured product.

Although the product formula approach is based on sound concepts, practical problems may prevent formulas from yielding accurate values for milk used in manufacturing. One problem is the need to ensure that the products included in the product formula represent the predominant products determining the market price for milk. Another problem is the need to ensure that these products are properly weighted in the formula. Assumptions with respect to make allowance, yields, and by-product values are also critical and sometimes not easily determined.

Finally, product formulas represent market conditions in product markets, not milk markets. Plants may pay more or less for milk used in manufacturing than suggested by product prices.

As part of our analysis, we constructed several different product price formulas and compared the resulting prices with the M-W price over a recent period of time. Comparisons made with the M-W price here and elsewhere in the report do not imply that the M-W price is an appropriate or "correct" measure of the value of milk used in manufacturing; they are merely to provide a basis for evaluating the relative performance of the formulas. The formulas and the results of our comparison are detailed in appendix II. In general, the product price formulas tracked the M-W price reasonably well. There is a seasonal pattern in the deviations, and changes in the product formula prices tend to lead corresponding changes in the M-W price. Our analysis did not provide a basis for identifying a preferred formula among those that were tested. In the following section we discuss how well this alternative reflects the characteristics we identified.

Reflects National Prices of Manufactured Dairy Products

Product formulas are superior to other mechanisms for this characteristic because (assuming no change in formula parameters) changes in the value of milk used in manufacturing depend solely on changes in prices of manufactured dairy products. However, the accuracy of the price

level depends on whether the reported prices in formulas are representative of national markets and make allowances are accurate. Currently, there is no national market price for nonfat dry milk, and national butter and cheese markets only make up a small proportion of total sales volume. Consequently, other sources of product prices may need to be considered. The product mix used in formulas is also critical and must correspond to the product mix actually produced.

Reflects National Supply-Demand Conditions for Milk Used for Manufacturing

While product prices and fluid milk prices are related, changes in both may not occur at the same time. The current M-W price often changes by more or less than indicated by product price changes because of factors such as changes in product yields, plant competition, and heightened demand for fluid milk. These kinds of market pressures are important in determining the value of milk used in manufacturing. Over time, the value of milk used in manufacturing would tend to be reflected in product prices, although not instantaneously.

Generates a Price That Is Not Significantly Affected by Local Conditions

Because manufactured product markets are national in scope, product formula prices would not be affected by local conditions. Moreover, the number of firms buying and selling manufactured dairy products is sufficiently large to ensure reasonably competitive markets. However, as discussed above, finding reported sales prices for manufactured dairy products that accurately reflect national market conditions may pose a problem.

Provides a Valid Mechanism for Setting Milk Prices Over the Long Term

The volume of milk used for manufactured products, primarily cheeses, is expanding relative to the volume used for fluid products. Consequently, there is virtually no likelihood that product volume will become too small to adequately determine milk value.

Automatic and Self-Adjusting

The critical nature of make allowances, product mix, by-product values, and product yields would require diligent attention. These factors would need to be adjusted periodically to ensure the accuracy of any product formula.

Economic Formulas

Economic formulas, like product formulas, derive milk values rather than report what is actually being paid. They are not as closely tied to

product prices as product formulas, because they use broader economic factors in an attempt to set a value for the milk used in manufacturing. For example, changes in such economic indicators as production costs and the Consumer Price Index would be weighted in an economic formula to establish a value for the milk used in manufacturing.

In a mechanical sense, economic formulas are easy to use. Data collection problems and judgment are minimized. Economic formulas also permit conditions affecting milk supply (production costs) to play a more direct role in establishing milk value. Use of broad economic indicators permits milk prices to change in accordance with general economic conditions. However, use of an economic formula may insulate milk prices from what is occurring in markets for butter, cheese, and nonfat dry milk.

We constructed several economic formulas and compared the prices generated with the M-W price. (See app. II.) The economic formulas yielded values for milk used in manufacturing that deviated substantially from the M-W price. In particular, those formulas in which industrial wages were heavily weighted produced prices that did not fall with reduced milk production costs. Accounting for increasing milk production per cow and tying prices to the level of milk surplus improved the economic formulas' ability to track the historical M-W price. In the following section we discuss how well this alternative reflects the characteristics we identified.

Reflects National Prices of Manufactured Dairy Products

Economic formulas would be deficient in reflecting manufactured product prices because they involve many factors that in the short run are not necessarily related to manufactured product prices. Economic formulas could be improved somewhat in this respect if manufactured product prices were heavily weighted in the formula. It would be difficult to construct an economic formula that would simultaneously reflect product prices, milk production costs, and general economic conditions completely. However, an economic formula could have factors representing each of these elements.

Reflects National Supply-Demand Conditions for Milk Used for Manufacturing

Depending on the assigned economic indicators and their weighting, indices that are employed may be too broad to accurately mirror supply-demand conditions for milk used for manufacturing. For example, a change in an overall wage index may not relate directly to supply-demand conditions for milk used for manufacturing.

Generates a Price That Is Not Significantly Affected by Local Conditions

Economic formulas are not affected by local conditions because any economic formula would contain factors representing national conditions.

Provides a Valid Mechanism for Setting Milk Prices Over the Long Term

Economic formulas can operate over a long period of time because they use factors that are permanent in nature.

Automatic and Self-Adjusting

Any formula would require periodic updating to ensure that factors and weights remained relevant and that "reasonable" prices were generated.

Administratively Determined Price

An administratively determined class III price would be set through an administrative process, such as a committee, hearing, or panel, as opposed to using a formula or a reported pay price. The price would not change automatically but would require an administrative action through one of these processes.

In our more detailed discussion of an administered price, we assume the class III price would be administratively set at the dairy price support level. (See app. II.) Currently, the support price is legislatively established and is set so that it adjusts somewhat in response to changes in the supply and demand for dairy products. In the following section we discuss how well this alternative reflects the characteristics we identified.

Reflects National Prices of Manufactured Dairy Products

Administered prices are not likely to closely reflect manufactured product prices unless frequent changes are made to the price, and the administering body considers factors that closely reflect manufactured product prices.

Reflects National Supply-Demand Conditions for Milk Used for Manufacturing

The extent to which an administered price reflects national supply-demand conditions for milk used for manufacturing depends on the frequency of price determinations and the extent to which the administering body's decision is influenced by such conditions.

Generates a Price That Is Not Significantly Affected by Local Conditions

Since the administratively determined price applies nationally, it should not be affected by conditions in any specific part of the country.

Provides a Valid Mechanism for Setting Milk Prices Over the Long Term

An administrative process to set prices would have long-term duration.

Automatic and Self-Adjusting

Administered prices are not by definition self-adjusting. Each change would require a person, or group of people, to decide when the change would be made and the amount of the change.

Conclusions

Given the declining trend in grade B milk production and the number of grade B purchasing plants, the major question is not whether an alternative to the M-W price needs to be developed, but when. In our view, USDA and the dairy industry need to start the lengthy and difficult process of developing and testing an alternative price series. They should not wait until the situation becomes critical. We have identified five alternatives that basically fall into three categories—series intended to reflect market-determined prices, formulas, and administratively determined prices.

Two market-determined pay price alternatives—the grade A regulated and deregulated price—would each overcome the problem of limited milk volume and declining number of purchasing plants that is the main concern about the present M-W series. Both market-determined pay price options would reflect national prices of manufactured dairy products and national supply-demand conditions for milk used for manufacturing, because of the large volume of milk priced and the increased number of milk purchasing plants. Both would have duration and would be automatic and self-adjusting. Both would generate a price that is generally not affected by local conditions. However, there could be some local influence because the price would be determined by transactions in Minnesota and Wisconsin.

While both of the grade A alternatives can accomplish what we have discussed previously, the deregulated grade A alternative has two drawbacks. It would treat some producers unequally by forcing them out of the marketing orders, thereby removing the benefit those producers receive from the marketing orders' minimum guaranteed prices. Additionally, this alternative would require major restructuring of the Chicago Regional and Upper Midwest Orders. We see no reason to force involuntary removal from orders or to cause major order restructuring in order to generate a pay price when the regulated grade A manufacturing price alternative would yield an equally acceptable measure without the equity and restructuring problems. Therefore, we favor the regulated grade A price alternative over the deregulated grade A price alternative.

We analyzed two formula prices—economic formulas and product formulas. Product formulas are superior to economic formulas in reflecting national prices of manufactured dairy products and national supply-demand conditions for milk used for manufacturing. Both formulas are not significantly affected by local conditions, and both would be long-lasting. Both formulas could be considered automatic and self-adjusting. However, formula elements, factors, and weights would need to be updated periodically. Because the product formula reflects national prices of manufactured dairy products and national supply-demand conditions for milk used for manufacturing better than the economic formula, the product formula would be a better alternative than the economic formula.

The remaining alternative—the administratively determined price--is not a preferred option. Without frequent adjustments, this alternative will not reflect changes in national prices of manufactured dairy products or national supply-demand conditions for milk as well as the other alternatives. Because these frequent adjustments would have to be made through the administrative process, it would not be automatic and self-adjusting.

Recommendations

As long as milk prices continue to be regulated, there will be a need for a pricing system to fill the role now played by the M-W price series. In view of the declining importance of grade B milk, GAO recommends that the Secretary of Agriculture initiate efforts to develop and test an alternative pricing series. GAO believes that the alternatives discussed in this report can provide a useful starting point for such an effort by USDA.

Agency Comments and Our Evaluation

In its June 27, 1989, letter, USDA said it shared GAO's interest in developing an alternative mechanism to eventually replace the M-W price series. However, the Department believes that the M-W price still is as good a means as there is for establishing prices in federal order markets and is a reliable measure of supply-demand conditions in the dairy industry. USDA commented further that there is no way of knowing at this time when the decline in grade B milk supplies will be significant enough to negate the M-W price's usefulness. GAO agrees that we do not know when the M-W price will become invalid. However, the significant declines in grade B milk production and in the number of grade B purchasing plants, along with the other deficiencies discussed in this report, are reducing its reliability as a fair indicator of the value of milk used in manufacturing. GAO believes that replacement of the M-W price series will be a difficult and lengthy process. Consequently, GAO believes that USDA should initiate the process of selecting an alternative to the M-W price series at this time. Such an alternative is needed before the M-W price becomes an invalid indicator of the value of milk used in manufacturing. USDA stated that this report can provide a framework for further analysis. The text of USDA's comments on a draft of this report is included in appendix III.

History of Marketing Order Pricing

In the 1940s and 1950s, administered pricing changes for individual markets under federal milk marketing orders were made via local supply-and-demand adjusters with little attention to intermarket price relationships. Over time, a more coordinated national pricing system evolved in which the M-W price for unregulated manufacturing milk was the basis for adjusting all federal order prices. These changes enabled national supply-demand conditions to be reflected simultaneously in all federal order prices.

Two types of mechanisms have been used in federal orders for pricing milk used for manufacturing purposes: a market-determined pay price (based on prices paid at unregulated manufacturing plants) and prices based on product formulas that derive milk values from product prices.

Market-Determined Pay Price Series

Various market-determined pay price series have been used to establish a value for milk used in manufacturing, including the "3-product" price series,[1] the "Midwestern Condensery" series, and, more recently, the M-W series.

The "3-product" price series, developed in 1949, was derived by summing the U.S. average prices paid producers for manufacturing grade milk used in (1) butter (and by-products), (2) American cheese, and (3) evaporated milk; each price was weighted by the quantities of milk used in each product each month. The 3-product series was in use in some orders as recently as 1967.

The "Midwestern Condensery" series was based on average reported prices paid for milk by Wisconsin and Michigan evaporated milk plants. It was first used in 1940, and by 1956, this price series was used as an element in class I pricing in 51 of 68 market orders. However, as the number of condensery plants declined, use of the series as a pricing factor also declined. As of October 1967, no orders used the Midwestern Condensery series as a basis for class I pricing.

The M-W price series was first adopted by the Chicago Regional Order in 1961. Eventually all federal orders established minimum class milk prices based on the M-W price.

[1]Officially designated as "U. S. Average Price Received by Farmers for Manufacturing Grade Milk Used for American Cheese, Evaporated Milk, and Butter and By-products."

Product Formulas

Most of the orders in the early period of the milk marketing order program used a product formula in pricing milk in excess of fluid needs. Under a product price formula, the value of milk is derived by subtracting manufacturing costs and profit margins, or "make allowances," from the price of the end products. As of December 1956, 84 percent of the orders used a product price formula as a factor for pricing milk in excess of fluid needs. As of October 1967, 19 percent of the orders used one or more product formulas for pricing milk in excess of fluid needs, and 25 percent used a product price formula in conjunction with a market-determined pay price. (These product price formulas were based primarily on butter/powder values, although some orders used a cheddar cheese formula.) The use of product formulas declined as the M-W price series was adopted by the marketing orders.

Alternatives to the M-W Price Series

This appendix provides a more detailed discussion of the alternatives to the M-W series described in chapter 3. Our objective is to explain the mechanics of implementing some of the options.

Regulated Grade A Manufacturing Price

The major concern with the current M-W pricing series is the relatively small and declining volume of grade B milk and the decreasing number of grade B purchasing plants on which to base a price. However, the volume of grade A milk in Minnesota and Wisconsin that is used for manufacturing is increasing. There are order-regulated ("pooled") grade A dairy plants in the Upper Midwest that use all or most of their grade A milk in manufacturing. These plants compete vigorously for milk supplies, often paying a price that is higher than minimum order blend prices. Hence, a reasonable replacement for the current M-W series is a similar series based on the value of grade A milk used for manufacturing in the Upper Midwest in combination with the grade B prices.

Grade A manufacturing milk values could be reported by a representative group of regulated manufacturing plants under the Chicago Regional and Upper Midwest Orders. These plants could be selected on the basis of their fluid use. For example, plants with no less than 90-percent manufacturing use might be chosen. The reported grade A manufacturing milk value would be the price a plant pays for grade A milk with 3.5-percent butterfat, or standard composition, less the amount by which the plant's zoned blend price exceeds its order's class III price.[1] In other words, revenue that the plant draws from the order pool because of its participation in the market's class I use would be excluded.

The Chicago Regional and Upper Midwest Orders are used in this example because those areas have a high concentration of plants that manufacture milk products and experience high manufacturing use. While other parts of the country could be considered, such as the Northeast, the concentration of plants is less, and the manufacturing use is lower.

The 90-percent manufacturing use criterion would allow an adequate number of plants and a large enough volume of milk to ensure a representative price. For example, in October 1987 (October is typically the

[1]Each independent (non-cooperative) plant regulated under a federal milk marketing order is obligated to pay a minimum blend price to affiliated producers. This price varies according to the plant's location relative to the major consuming center in the market, in order to offset the costs of hauling milk to the consuming center. Most orders have several zones (mileage intervals) emanating from the central market, with equal minimum blend prices within the zones.

month with the largest percentage of fluid use), 16 of the 31 manufacturing plants regulated under the Upper Midwest Order used at least 90 percent of their milk receipts for manufacturing. These 16 plants accounted for 365 million pounds of milk during that month—52 percent of all grade A milk pooled under the Upper Midwest Order. For the same month, 58 of the 79 similar plants regulated under the Chicago Regional Order used at least 90 percent of their grade A milk receipts for manufacturing. These plants accounted for 541 million pounds, or 51 percent of all milk pooled in the order.

The major obstacle to using grade A manufacturing prices to establish a value for milk used in manufacturing is that the pay price for order-regulated plants now depends on the class III price—the proposed measure of the value of milk used in manufacturing would thus be dependent on itself. This obstacle could be overcome by an amendment to the legislation and an order modification that would exempt reporting grade A plants from paying the minimum order blend price while continuing to include them in the order's revenue-sharing arrangements. Then the value of milk used by those plants for manufacturing could be derived from the prices they pay producers.

The major step in this derivation is to account for revenues that plants using milk primarily for manufacturing dairy products receive from plants with high fluid sales through the order's revenue-sharing arrangements, generally known as marketwide pooling.[2] Within a milk marketing order, regulated plants must pay producers at least the minimum blend price that is based on the minimum prices for each class of milk and the share of milk used in each class. That means that the minimum blend price will be less than the value of milk used for fluid sales and greater than the value of milk used for manufacturing dairy products. Therefore, purchasing plants that use milk for fluid sales in greater proportion than the order average will pay into the order's pool while those that use milk for manufacturing dairy products in greater proportion than the order average will receive money (called a "pool draw").

Because the plants that would be exempt from paying minimum blend prices and would, therefore, become the source of data on grade A pay prices are plants that primarily use milk for manufacturing dairy products, these plants would receive pool draws from marketing order

[2]Because these plants often use some of the milk they purchase for fluid sales, it might also be necessary to adjust for cooperative over-order premiums. A cooperative over-order premium is a payment charged by a producer's cooperative in excess of the minimum price specified by a marketing order; it usually applies to class I milk.

administrators. Regulated plants that use all of the milk they purchase for manufacturing would receive pool draws equal to the difference between the order blend price and the order minimum price for manufacturing class milk. Plants that use some of the milk they purchase for fluid sales, but a smaller portion than the order average, receive smaller draws in accordance with their actual fluid use rates. But, in both cases, to calculate the value of milk used in manufacturing, one must subtract the difference between the order's blend price and its minimum manufacturing class price from the reporting plants' pay prices. This calculation adjusts pay prices for the higher value of fluid milk that is included in blend prices.

Although the actual adjustment is not known until after the current month, market administrators should be able to forecast these draws fairly accurately. The adjustments are based primarily on class I use and the orders' class I differentials. These differentials, the amount by which the minimum class I price exceeds the minimum manufacturing class price, are fixed for each order for long periods of time. Class I use is not known until some time after the current month, but market administrators could probably estimate these values during the current month with sufficient accuracy on the basis of past history and current trends. Class II sales would also add a small amount to the pool draw, but both class II use and prices could also be fairly accurately forecast before the fact.

To correct for hauling subsidies, reporting grade A plants would be required to report the difference per hundredweight between hauling costs and hauling receipts. This amount would be included as a premium in the reported price, just as premiums for volume and location are now included. To allow for appropriate adjustment to a standard milk composition, reporting plants would be requested to report their premiums for a standard protein or solids-not-fat level and at the actual level. The difference would be added or subtracted—just like the butterfat differential—in the reporting of a standard composition price.

A critical element in the use of grade A pay prices to establish the value of milk used for manufacturing relates to the timing of payment. Regulated plants do not typically pay for milk in the same month it is delivered: milk delivered in June is paid for in July, after the June M-W price is announced. Freeing plants from the minimum order blend price requirement would, in principle, allow them to pay for milk in the month delivered. Whether they would do so in practice is unknown. However, the same issue of the timing of payment applies to grade B plants in the

M-W samples, many of which report estimated rather than actual payments to producers.

If grade A and grade B milk are of comparable quality and composition, prices for grade A milk may be higher than grade B milk by an amount greater than can be accounted for by market order pricing and over-order premiums. In this case, adoption of the regulated grade A alternative would be likely to raise class III prices. This increase, in turn, would elevate the structure of milk prices nationwide through the federal order classified pricing system. To avoid this outcome, class I differentials could be reduced by the amount necessary to assure that the net price to the producer under the current M-W price series would not change as a result of the change in pricing mechanism.

As long as the reporting plants continue to receive pool draws, they will be able to continue paying producers about as much as other plants purchasing grade A milk. In the Chicago Regional and Upper Midwest orders, there is likely to be sufficient competition among purchasing plants so that the benefits of pool participation are passed along to producers even if some plants are exempted from paying minimum blend prices. Therefore, under this alternative, producers are likely to receive about the same price for their grade A milk regardless of whether they sell to plants required to pay the minimum blend price or to plants that are exempt from paying this minimum.

Deregulated Grade A Manufacturing Price

Another alternative to the present M-W series is to establish a pricing series based on manufacturing milk prices reported by some deregulated (depooled) grade A manufacturing plants in combination with reported grade B prices.

This alternative series would depool those grade A manufacturing plants in the Upper Midwest and Chicago Regional Orders whose milk is not needed to fulfill the market's fluid needs. The Chicago Regional and Upper Midwest Orders are used in this alternative because those areas have a high concentration of plants that manufacture milk products and use a high percentage of grade A milk for manufacturing dairy products. Because of certain economic incentives associated with pooling milk, the quantity of grade A pooled milk received by plants is far in excess of the milk required to serve the fluid consumption needs in the Chicago or Upper Midwest markets. One economic incentive for pooling milk is that minimum blend prices that producers are guaranteed tend to be higher than prices that would be received outside the pool.

Prior to 1984, the Chicago Regional Order attempted to reduce the incentives for pooling unlimited quantities of milk by imposing shipping requirements. These requirements meant that pooled manufacturing plants were required to demonstrate their ability to serve the fluid market by periodically shipping milk to a fluid distributor, regardless of whether it was needed. These shipping requirements led to inefficiencies, with milk being transported to a fluid plant, unloaded, reloaded, and transported back to the grade A manufacturing plant from which it came.

In 1984, the Chicago Regional Order was modified by eliminating shipping requirements. Under this revised system, plants could be pooled without regularly demonstrating their ability to service the fluid market. Instead, plants that manufactured most of their grade A milk could request "reserve supply plant" status under the order. Reserve supply plants were obligated to ship milk to fluid plants only when there was a shortage, in which case the market administrator issued a "call" upon reserve supply plants to ship. Such calls were seldom issued, since threats of a call usually serve to free up milk in periods of tight supply. As a result, reserve supply plants had little or no obligation to service the fluid market but enjoyed the same benefits as plants that regularly supplied most of their milk to bottlers.

Shipping requirements in the Chicago Regional Order were reinstated in 1988 following a hearing at which officials of fluid plants stated that they were periodically having difficulties obtaining sufficient quantities of milk. Shipping requirements were reinstated not because of the absence of sufficient quantities of milk, but rather because plants preferred not to supply the fluid market because of the costs associated with operating their manufacturing facilities at a lower capacity.

The Upper Midwest Order was instituted in 1976 without shipping requirements (the same provisions as in the Chicago Regional Order from 1984 to 1988). Shipping requirements were added to the Upper Midwest Order in July 1988.

Under this deregulated grade A manufacturing price alternative, milk prices for the depooled grade A plants would not be set by the federal order, and these plants would not share in receipts for class I milk used in the market because these plants would not be regulated by the order. This depooling would require hearings, followed by a major restructuring of the two marketing orders. The depooled grade A manufacturing plants, along with grade B plants, would report their prices to USDA and

would make up the population of plants for inclusion in this price series. These plants would have more than three times as much milk volume as grade B plants in Minnesota and Wisconsin that form the plant population for the current M-W price—about 25 billion pounds total, compared with the 1988 grade B volume of 8 billion pounds.

Depooled plants would be expected to be located far from the metropolitan market centers of Chicago and Minneapolis-St. Paul because milk used for fluid purposes in these markets would come from those producers located closest to the markets. Milk produced only within a certain distance of the market center would be allowed to be pooled. That distance would be set, after milk order hearings, by the Secretary of Agriculture. For example, if it was determined that 50-percent fluid use was required to satisfy these markets' fluid needs, market order data indicate that producers within a radius of approximately 75 miles from Minneapolis-St. Paul and 150 miles from Chicago would produce enough milk to fill these needs and would be allowed to be pooled. Producer prices would be set so that the price received at the market fringe would approximate the manufacturing price.

Because of the reduced volume of milk being regulated by the order, and the higher percentage fluid use within the order, the blend price would be higher after the selected plants were removed from the order. Adjusting the fluid use rates that existed in 1987 to 50 percent, the blend prices for the Upper Midwest Order would increase by an average of about $0.40 to $0.50 per hundredweight, while the blend price in the Chicago Regional Order would increase by an average of about $0.25 per hundredweight.

Depooled plants would have no obligation to ship to fluid markets, would enjoy none of the benefits of the pool, and would be required to compete for the available milk supply in an unregulated market environment. Producers may view this alternative negatively because some producers would be treated unequally because they could not share in the benefits—which would now be greater because of the higher blend price—that these plants formerly received from pool participation. Because the depooled plants would no longer be receiving pool draws to supplement their revenue from product sales, the prices these plants could afford to pay producers would be lower than the prices other producers would receive from pooled plants.

Such changes in receipts do not consider the implications of changes in reporting hauling subsidies or component pricing. To correct for hauling

subsidies, reporting plants would be required to report the difference per hundredweight between hauling costs and hauling receipts. This amount would be included as a premium in the reported price, just as premiums for volume and location are now included. To allow for appropriate adjustment to a standard milk composition, reporting plants would be requested to report their premiums for both "standard" protein or solids-not-fat and "at test." The difference would be added or subtracted—just like the butterfat differential—in the reporting of a standard composition price.

The limited objective of improving the reliability of the M-W price series would not require depooling plants in orders other than the Upper Midwest and Chicago Regional Orders. The depooling option is particularly well-suited to these two markets because of the large number of competitive plants and the large volume of milk. In other markets where a smaller number of competitive plants exist, depooling would not necessarily be an advisable strategy. Since plants would not be required to pay the minimum price, reduced competition could allow plants to underpay producers, something that federal orders are intended to prevent.

A variation of this alternative was discussed in a 1978 study.[3] In this presentation a manufacturing milk order would be established, with equalization payments being paid from the fluid milk markets. The effects of this alternative would be similar to the regulated grade A alternative.

Product Formulas

The current M-W price measures what buyers of grade B milk pay for the milk used in butter, cheese, nonfat dry milk, and other manufactured dairy products. Obviously, selling prices for these manufactured products are important in determining what plants can afford to pay for milk. The use of a product formula to establish the value of milk used in manufacturing would rely directly on these selling prices to reflect appropriate raw product (milk) values, whether grade A or grade B milk. A product formula derives milk value rather than reports actual pay prices.

Using a product formula, prices for major manufactured products would be obtained from published government reports or collected from plants

[3]Robert E. Jacobson, Jerome W. Hammond, and Truman F. Graf, Pricing Grade A Milk Used in Manufactured Dairy Products, Ohio Agricultural Research and Development Center, December 1978.

or central markets. Normal product yields (for example, the number of pounds of cheese that can be made from a hundredweight of milk) would be applied to product prices to establish the product value per hundredweight of milk. Where applicable, by-product values would be added to primary product value to obtain gross plant revenue per hundredweight of milk processed. Finally, an appropriate allowance for plant profit and manufacturing costs (make allowance) would be subtracted from gross revenue to derive the value of milk used in manufacturing.

To use a simplified example, a cheddar cheese price formula might be used to derive the value of milk used in manufacturing. About 10 pounds of cheese can be obtained from 100 pounds of milk. At a reported cheddar cheese price of $1.20 per pound, a cheese plant would, therefore, have $12.00 in cheese revenue for each hundredweight of milk the plant processed. In addition, the plant might sell dried whey produced as a by-product of cheese manufacturing. If whey sales equalled 50 cents per hundredweight of milk processed, total gross revenue per hundredweight would be $12.50. Assuming that normal cheese plant costs and profits are $1.40 per hundredweight, net revenue would be $11.10 per hundredweight. This value—what the plant has available to pay producers for milk—would then be the derived value of milk used in manufacturing.

Product formulas have been and still are used to establish milk values. In the 1950s and 1960s, several federal marketing orders based class prices on the prices paid for American cheese, butter and by-products, and evaporated milk. California uses a product formula based on butter and nonfat dry milk prices to set prices for milk used in manufacturing under its state milk pricing program. The federal price support program uses a "reverse" product formula in setting its purchase prices for butter, nonfat dry milk, and cheddar cheese; that is, assumed product yields, by-product values, and manufacturing margins are used in translating announced support levels for manufacturing milk to equivalent product prices.

An attractive feature of product formulas is simplicity in a mechanical sense. Once the formulas are constructed, little judgment is necessary. They also convey a sense of market fairness—dairy producers should be rewarded for what their milk ultimately sells for as manufactured product.

Although the product formula approach is based on sound concepts, several practical problems may prevent the development and maintenance of formulas yielding accurate values for milk used in manufacturing. For example, the selection of manufactured products to be included in a product formula and the weights associated with those products present major challenges. Using one product, such as cheddar cheese, may yield a distorted price for milk used for other manufactured products or prevent the shifting of milk supplies among products. For example, Italian cheeses account for an increasing share of total cheese production. Prices for cheddar and Italian cheese varieties are established in related, but different, markets with different demand and supply conditions. A product mix would more accurately represent actual market experience but would require collection or specification of prices, yields, manufacturing costs, and by-product values for each product included in the composite formula. Moreover, weights assigned to various products would need to be frequently revised to conform to changing consumption patterns.

Assumptions with respect to make allowance, yields, and by-product values are also critical. Keeping these factors current might be costly. Manufacturing costs vary substantially among firms according to plant size, equipment, and product mix. Make allowances would need to be frequently reviewed and updated to ensure that they reflect actual cost experience.

Product yields vary among plants seasonally as well. Use of a constant yield factor, without adjusting to a uniform protein base, would tend to "overprice" milk in the summer, when cheese yields are typically low, and "underprice" milk in the winter, when yields are higher. Product yields are also sensitive to changes in manufacturing practices.

Establishing by-product values, such as a whey value, presents a challenge in setting product formulas. Some cheese plants dispose of their whey in municipal waste treatment facilities or spread it on producers' fields. Other plants recover all fat and nonfat solids and sell them in commercial markets. These plants incur different costs and face different product prices. With this amount of diversity, it is difficult to establish a "fair" whey value in a product formula. This problem is an integral part of establishing an appropriate make allowance.

A key issue in using formulas is what product prices to use. Prices reported on central butter and cheese markets reflect only a minute proportion of total sales. These markets have been subject to considerable

criticism because of the potential for their manipulation. Cheese and butter sales other than those on the central exchange are usually based on reported prices on these central markets, compounding the problem of price reporting. Reported prices, such as the Wisconsin Assembly Point price for cheddar cheese, may be inadequate for use in a product price formula because of the current lack of attention in reporting such factors as premiums, discounts, lot size, and moisture.

Finally, product formulas represent market conditions in product markets, not milk markets. Plants may pay more or less for milk used in manufacturing than suggested by product prices. Imputed milk values based on product prices in Minnesota and Wisconsin often demonstrate substantial deviations from the M-W price. This may occur because of localized and/or temporary market conditions related to plant capacity, abnormal product yields or milk quality, or product price expectations. Plant capacity is especially important in this regard. In periods of tight milk supplies, it is common for plants in major manufacturing regions to pay premiums to maintain or attract milk supplies.

To illustrate the use of product formulas, we used four product price formulas to calculate monthly values for milk used in manufacturing from 1980 through 1987. One formula (butter/powder) uses butter[4] and nonfat dry milk[5] prices to derive a price for milk used in manufacturing. Two formulas are based on cheddar cheese prices.[6] One of these considers only the butterfat portion of whey (cheese/butterfat) in deriving by-product value. This approach is consistent with that used in converting the federal price support level to Commodity Credit Corporation purchase prices for cheese. The other cheese price formula (cheese/whey) uses prices for dry whey solids[7] to establish by-product value. The fourth formula is a combination of the butter/powder and cheese/butterfat formulas.

[4]Product prices for butter include the following factors: average wholesale selling prices for grade A butter, delivered Chicago metropolitan area; in trucklots; bulk in fibre boxes.

[5]Product prices for nonfat dry milk include the following factors: wholesale prices for nonfat dry milk; spray process; at Chicago area plants.

[6]Product prices for cheddar cheese include the following factors: average prices paid free-on-board Wisconsin assembly points; carlot or trucklot quantities; less than 60-day old cheese; 37.8-39.0 percent moisture; USDA grade A or better or equivalent state brand.

[7]Product prices for dry whey include the following factors: prices paid free-on-board central states for edible nonhygroscopic whey powder; carlot or trucklot quantities; in 50 or 100-pound bags.

The assumptions used in the two cheese formulas and the butter/powder formula are shown in table II.1. Product yields are normal recoveries for milk of 3.5-percent butterfat composition and average quality. For by-product yields, the cheese/butterfat formula uses the rate of butterfat recovery assumed in the dairy price support program, and the cheese/whey formula uses an assumed industry average recovery rate of 2 pounds of dry whey per hundredweight of milk. This average recovery rate considers plants that recover whey and those that do not. The make allowances are those used in the federal dairy price support program.

Table II.1: Product Formula Assumptions

	Assumptions		
Factors	**Butter/powder**	**Cheese/butterfat**	**Cheese/whey**
Yield (pounds per cwt at 3.5% butterfat)	Butter—4.2 Nonfat dry milk—8.13	9.87[a]	9.87[a]
By-product credit	None	.25 lb. butter times Chicago wholesale butter price	2 lb. dry whey times central states whey powder price
Make allowance ($ per cwt)	$1.22	$1.37	$1.37

[a]Cheese yield is calculated using the Van Slyke yield formula for cheddar cheese with 38-percent moisture. The specific formula used is

$$\text{Yield} = \frac{1.09 \times (.93 \times 3.5 + .78 \times 3.15)}{.62}$$

The values .93 and .78 represent butterfat and protein recovery, respectively. The values 3.5 and 3.15 are butterfat and protein tests in percent. The value of .62 is 1 minus moisture content (.38). The value 1.09 represents recovery of solids in cheese other than butterfat and protein.

The combination butter/powder and cheese/butterfat formula is merely a weighted average of the milk prices derived from the two formulas. The weights are the relative proportions of milk used in the United States for butter and cheese production in the previous calendar year; that is, the weights are constant for 12 months at the previous year's average level.

Derived manufactured milk values from the product formulas are compared with the published M-W price for 1983 through 1987 in figures II.1 through II.4. Table II.2 summarizes deviations of the formula values from the M-W price for 1980 through 1987. Comparisons made with the M-W price here and elsewhere in the report do not imply that the M-W price is an appropriate or "correct" measure of the value of milk used in manufacturing; they are merely to provide a basis for evaluating the relative performance of the formulas.

Figure II.1: Comparison of Product Formula Price Using Butter/Powder With M-W Price, 1983-87

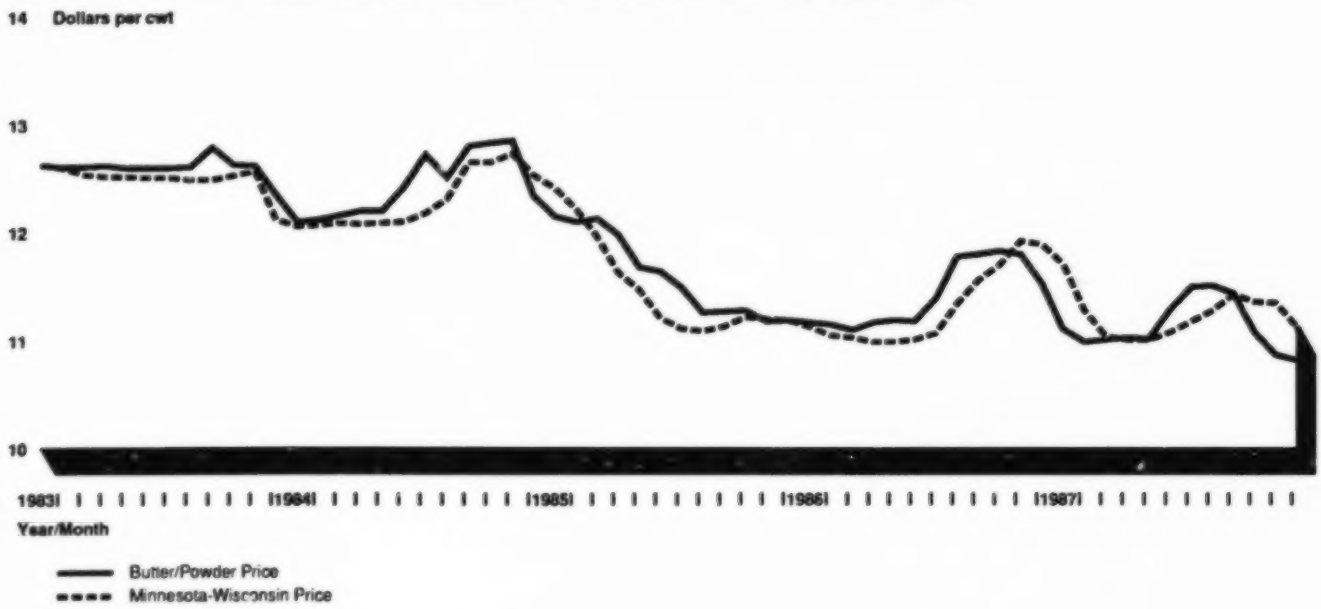


Figure II.2: Comparison of Product Formula Price Using Cheese/Butterfat With M-W Price, 1983-87

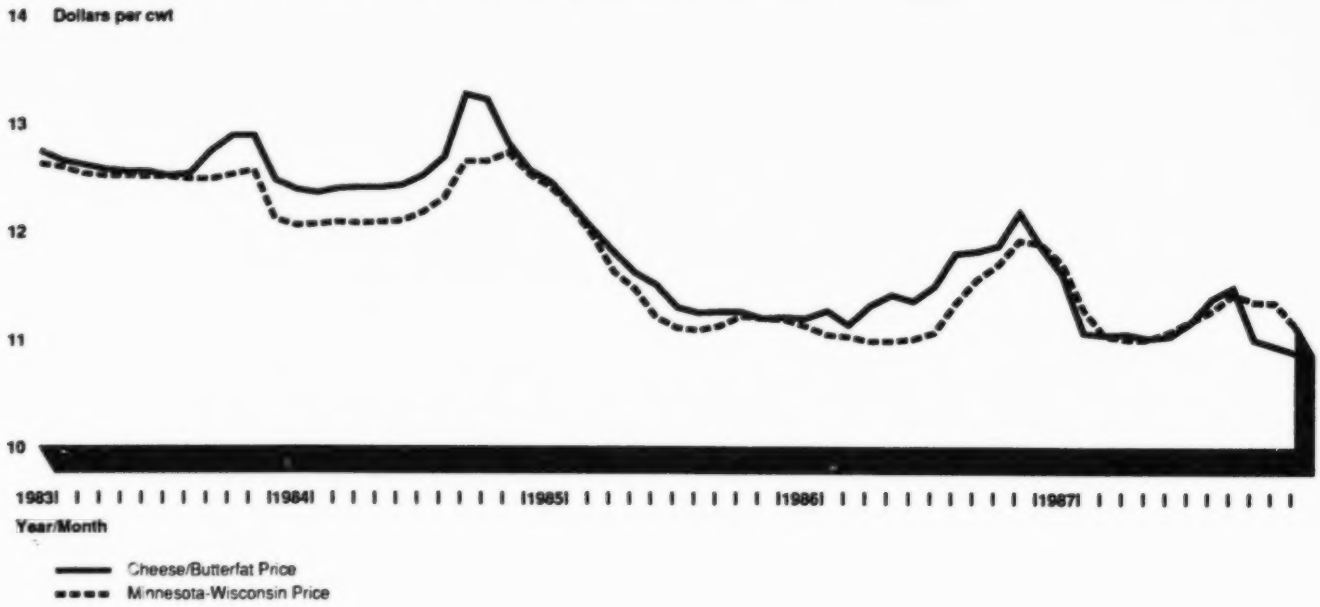


Figure II.3: Comparison of Product Formula Price Using Cheese/Whey With M-W Price, 1983-87

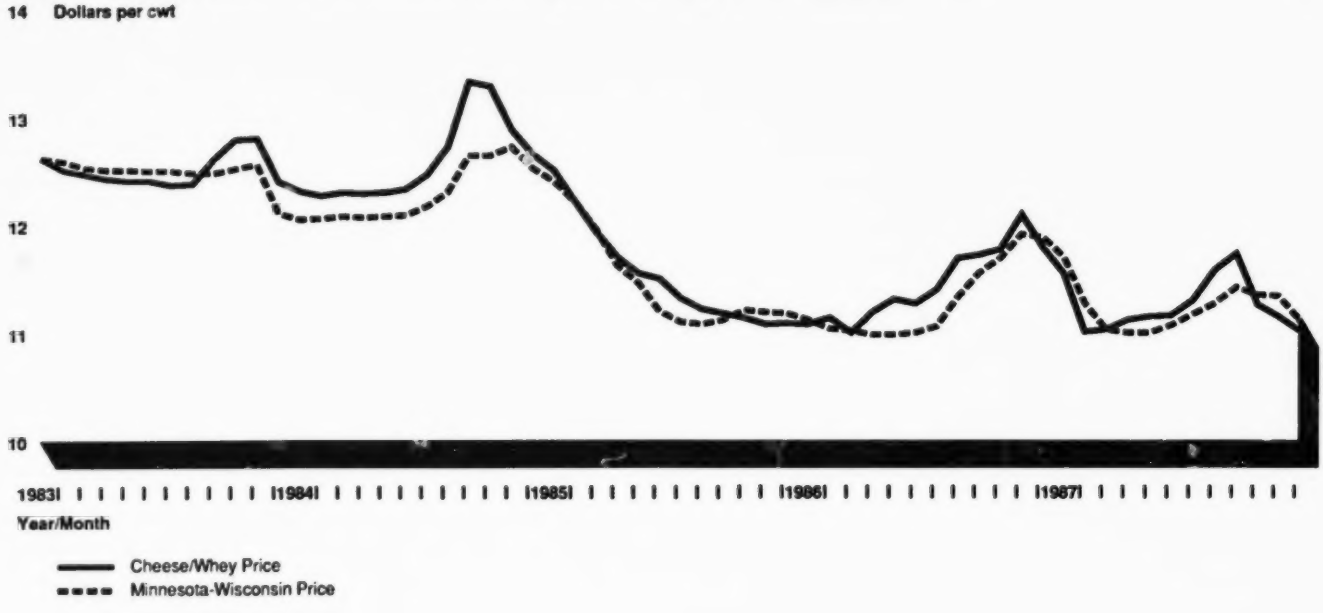


Figure II.4: Comparison of Product Formula Price Using Butter/Powder and Cheese/Butterfat With M-W Price, 1983-87

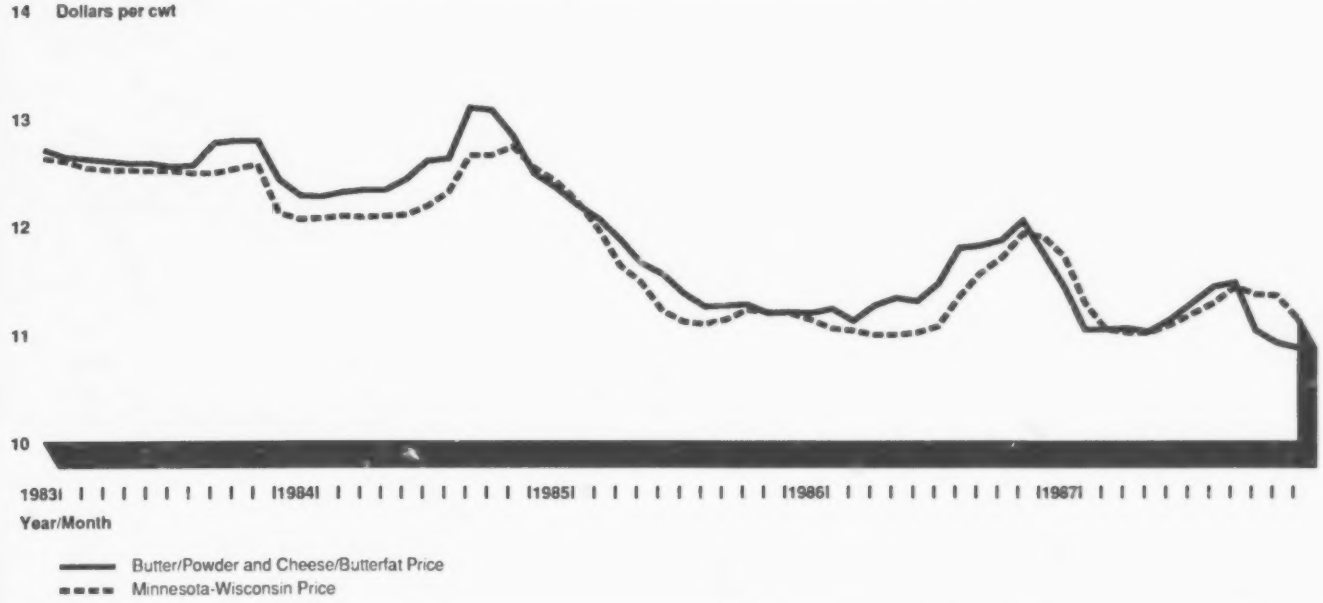


Table II.2: Statistical Summary of Deviations, Product Formula Measures of Manufacturing Milk Values Versus M-W Price Monthly Observations, 1980-87

	Formula			
Statistical measure	Butter/ powder	Cheese/ butterfat	Cheese/ whey	Butter/ powder & cheese
Actual deviation				
Mean	$0 061	$0 164	$0 122	$0 125
Standard deviation	196	175	178	162
Absolute deviation				
Mean	159	194	167	170
Standard deviation	129	142	137	114
Maximum deviation	541	622	677	454
Minimum deviation	−0 601	−0 403	−0 256	−0 431

Note: Deviations are the values derived from the formulas minus the M-W price for the same month.

The derived values track the M-W price very well, and there is little empirical basis for distinguishing among the four formulas. There is a noticeable seasonal pattern in the deviations. Manufactured milk values derived from the formulas tend to be higher than the M-W price in the

spring and lower in the fall. This pattern is evidence that market pressures resulting from tight milk supplies in the fall raise the M-W price above the level expected on the basis of product values.

There is also some evidence that changes in product prices "lead" corresponding changes in the M-W price. Peaks and valleys in the derived series usually occur before those in the M-W series. This pattern is consistent with the notion of derived demand; the demand for milk used in manufacturing at the farm level is derived from retail and government demand for manufactured dairy products.

In general, the product price formulas tracked the M-W price reasonably well. Our analysis did not provide a basis for identifying a preferred formula among those that were tested.

Economic Formulas

Economic formulas derive milk values rather than report what is actually being paid. They are not as closely tied to product prices as product formulas and incorporate economic factors other than product prices.

Conceptually, economic formulas use factors influencing supply and demand to try to approximate "reasonable" prices. They convey a sense of fairness—if feed prices are rising and consumer purchasing power is up, then milk prices should also increase. A properly constructed economic formula can ensure this result.

Usually, changes in such economic indicators as production costs and consumer income are weighted in an economic formula to establish a value for milk used in manufacturing. For example, a simple economic formula might "move" the manufacturing milk value according to changes in milk production costs per hundredweight and the cost of living. Per hundredweight milk production costs might be measured by USDA's Index of Prices Paid by producers divided by a seasonally adjusted monthly index of milk yield. The cost of living could be reflected by the Consumer Price Index. For example, if these two indices are each weighted equally in the economic formula, then a month-to-month change in the milk yield-adjusted Index of Prices Paid by producers of +2 percent and in the Consumer Price Index of -1 percent would increase the price of milk used in manufacturing by 0.5 percent [(2.0 X .5) + (-1.0 X .5) = 0.5].

Setting prices through economic formula is common in the dairy industry. From 1949 to 1981, the price support level under the dairy price

support program was set according to parity, which is a complex economic formula based on overall farm production costs relative to overall farm prices. In theory, parity prices for agricultural commodities were designed to maintain the same purchasing power as between 1910 and 1914. In reality, recent rapid improvements in output per cow caused parity prices to increase dairy producers' purchasing power, thus stimulating excess milk production.

California class I milk prices are set using an economic formula that weights milk production costs (43 percent), California manufacturing milk prices (42 percent), and average California manufacturing weekly real earnings (15 percent). Fluid milk prices throughout Canada are also set by economic formula. The formula for fluid milk prices in Ontario, for example, uses as components and weights: cash costs of milk production index (40 percent), average Ontario industrial workers weekly earnings (25 percent), and industrial product price index (35 percent).

Economic formulas are easy to use in a mechanical sense. Data collection problems and judgment are minimized. Economic formulas also permit conditions affecting milk supply (production costs) to play a more direct role in establishing milk value. Use of broad economic indicators permits milk prices to change in accordance with general economic conditions.

While advantageous from certain perspectives, the mechanical nature of economic formulas may be a serious shortcoming. Market conditions in dairy product markets would not be expected to always mirror conditions in the milk production sector or the general economy. Use of an economic formula may insulate milk prices from what is occurring in markets for butter, cheese, and nonfat dry milk.

Use of economic formulas to change milk prices runs a major risk of yielding distorted incentives to dairy producers. This risk is best exemplified by the United States' experience during the late 1970s. The Food and Agriculture Act of 1977 (P.L. 95-113, Sept. 29, 1977) fixed dairy price supports at 80 percent of parity and required semiannual adjustments in the support level. Subsequent reductions in feed prices and gains in milk production per cow were not reflected in the parity formula. Thus, profitability at the support price increased, and dairy producers responded by substantially increasing milk production above commercial needs. Recent surplus problems were a vestige of this parity problem. The lesson learned is that if an economic formula is used to move milk prices, there must be flexibility to change weights or to

rescind formula changes if the formula results send the wrong signal to dairy producers.

We constructed several economic formulas to illustrate how they might be used to derive values of milk used in manufacturing and to compare derived values between 1979 and 1987 with the M-W price series. These formulas are illustrative only; they should not be construed as suggested candidates for replacing the M-W price as an indicator of the value of milk used in manufacturing.

We used three basic formulas: (1) dairy parity, (2) California class I modified, and (3) Ontario class I modified. The weights and indices used in constructing the formulas are shown in tables II.3 through II.5.

Table II.3: Indices and Weights Used in Constructing a Dairy Parity Economic Formula

Index	Weight
Feed	0.35
Feeder livestock	0.05
Seed	0.02
Fertilizer	0.05
Agricultural chemicals	0.01
Fuels and energy	0.03
Farm and motor supplies	0.04
Other machinery	0.08
Buildings and fencing	0.10
Wage rates	0.06
Interest	0.06
Taxes	0.03
Farm services and cash rent	0.07
Miscellaneous	0.05
Total	**1.00**

Table II.4: Indices and Weights Used in Constructing the California Class I Modified Economic Formula

Index	Weight
Dairy parity[1]	0.43
Federal dairy price support level	0.42
Industrial wages[2]	0.15
Total	**1.00**

[1]This is the composite index from the dairy parity formula.

[2]Average hourly earnings of U.S. nonagricultural industrial employees. Compiled from Survey of Current Business.

Table II.5: Indices and Weights Used in Constructing the Ontario Class I Modified Economic Formula

Index	Weight
Dairy parity[1]	0.40
Industrial wages[2]	0.25
Producer price index	0.35
Total	**1.00**

[1]This is the composite index from the dairy parity formula

[2]Average hourly earnings of U.S. nonagricultural industrial employees. Compiled from Survey of Current Business

The dairy parity formula is based on milk production costs as represented by selected production cost indices published by USDA. The formula uses a set of weights that correspond to approximate percentages of total milk production costs. These weights are then applied to cost index value changes to derive changes in the value of milk used in manufacturing.

The other two basic formulas approximate the pricing formulas noted earlier that are used to price milk consumed in fluid form in California and Ontario, Canada. The formula indices used in California, as described previously, are California-specific. The equivalent indices used here represent comparable factors, but for the United States instead of California. Weights are those used in the California formula.

The Ontario formula is used to set fluid milk prices in Ontario. As in the California formula, the indices used in Ontario are Ontario-specific. The equivalent indices used here represent comparable factors, but for the United States instead of Ontario. The weights, however, are identical to those used in Ontario. In the modified formula used here, the milk production costs index is represented by the U.S. dairy parity index, the weekly earnings index by U.S. industrial earnings, and the industrial product price index by the U.S. Producer Price Index.

To derive prices using the three formulas, each applicable monthly index or price series value was expressed as a ratio of its average value for 1983. These monthly ratios were then multiplied by the relevant formula weights to form a composite ratio. The composite ratio was multiplied by the average value of the M-W price for 1983 to derive a monthly manufacturing price. Note that in "real life" some base price would have to be specified as a starting point. In this example, the average M-W price in 1983 was used as a base in order to evaluate how formula prices compared with the M-W price.

Two other economic formulas were constructed as variants of the dairy parity formula. They represent an attempt to incorporate more realistic pricing factors. One (yield-adjusted dairy parity) accounts for changing productivity in dairy farming by dividing the derived dairy parity price by an index of milk production per cow. The index was constructed by expressing monthly milk per cow in the United States as a ratio of milk per cow for the same month in 1983.

The second variant of the dairy parity formula (supply-demand adjusted dairy parity) adjusts the simple dairy parity formula price for competitive conditions in the U.S. cheese market. This is a kind of "trigger" formula based on the relationship between the market price for cheese as indicated by the monthly Wisconsin assembly points price for 40-pound blocks of cheddar cheese and the Commodity Credit Corporation purchase price for cheddar cheese. If the market price is more than 2 cents per pound above the Commodity Credit Corporation purchase price, for example, then the formula value is the higher of the simple dairy parity value and the U.S. dairy price support level for milk of 3.5-percent butterfat content.[8] If the spread is less than 2 cents, then the adjusted dairy parity formula value is the lower of the same two values.

Figures II.5 through II.9 compare the results of the five economic formulas with the results of the M-W price series for 1983 through 1987. Table II.6 shows statistics relating to deviations of the formula values from the M-W price for 1979 through 1987.

[8]The 2-cent price spread is arbitrarily specified as an indicator of "significant" market strength. Over the 1979 through 1987 period, the actual spread (market price minus Commodity Credit Corporation purchase price) ranged from -2.75 cents to 15.5 cents per pound.

Figure II.5: Comparison of Economic Formula Price With M-W Price—Simple Dairy Parity, 1983-87

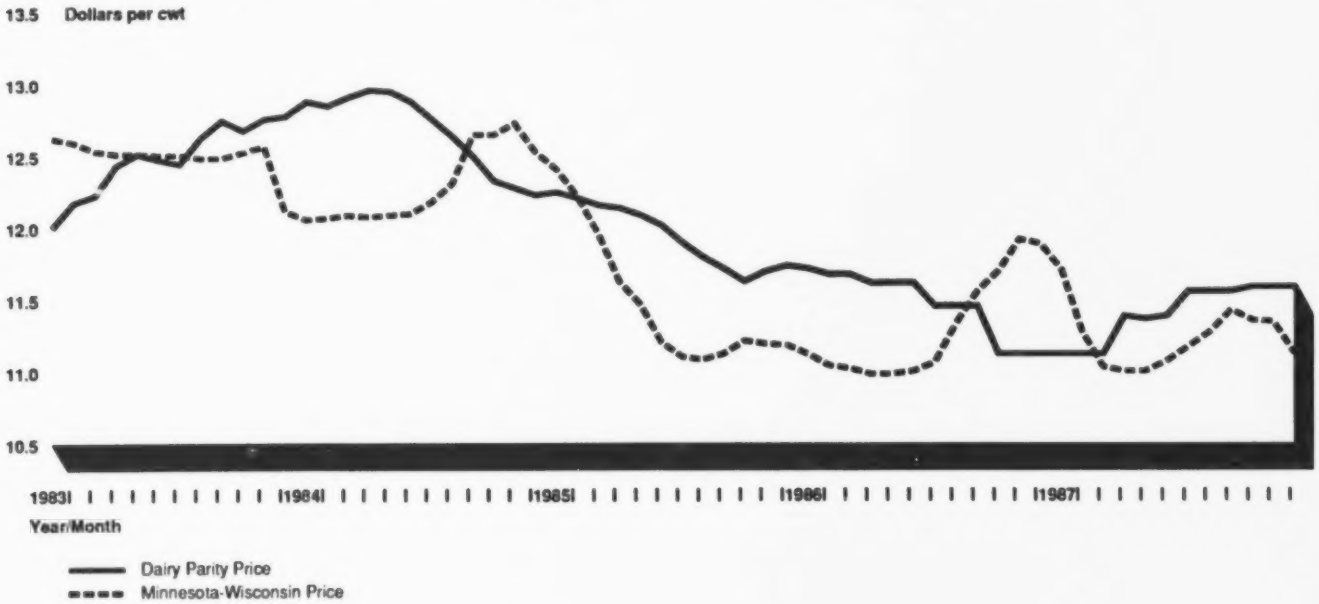


Figure II.6: Comparison of Economic Formula Price With M-W Price—California Class I Modified, 1983-87

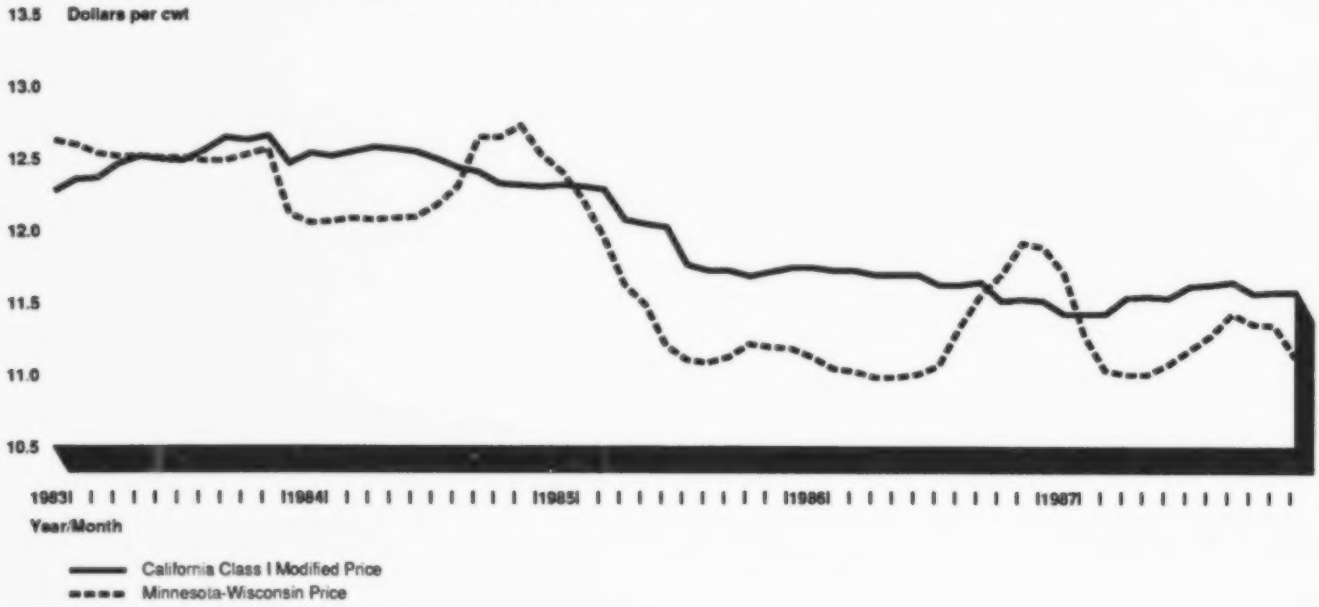


Figure II.7: Comparison of Economic Formula Price With M-W Price—Ontario Class I Modified, 1983-87

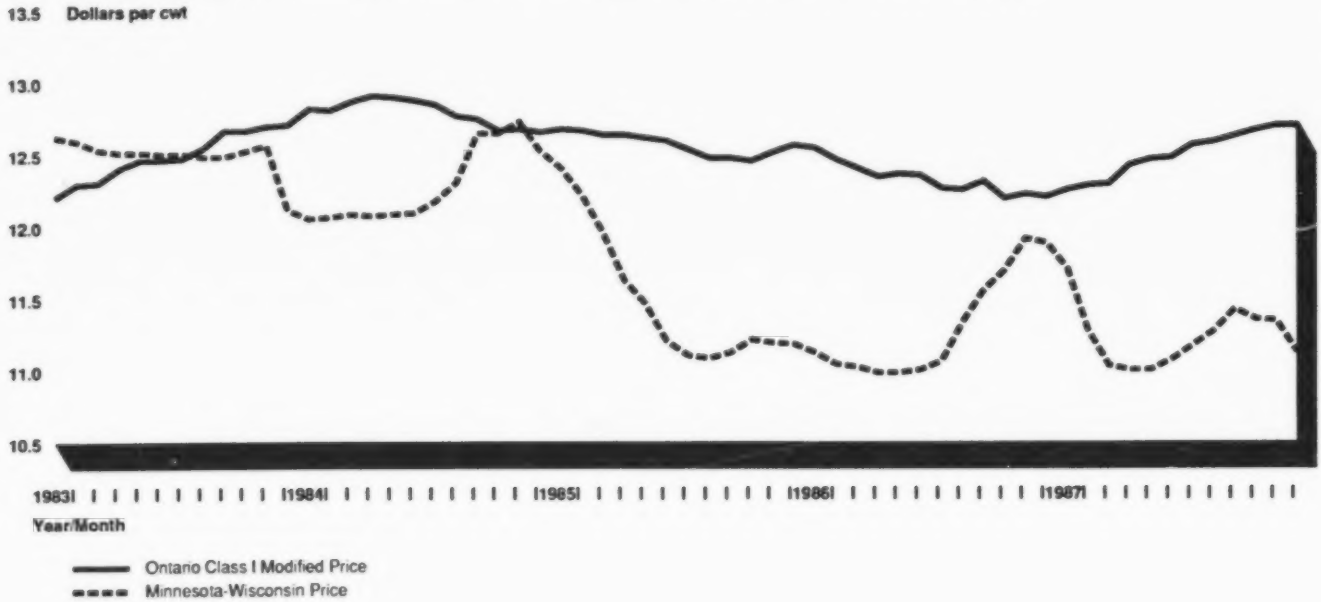


Figure II.8: Comparison of Economic Formula Price With M-W Price—Yield-Adjusted Dairy Parity, 1983-87

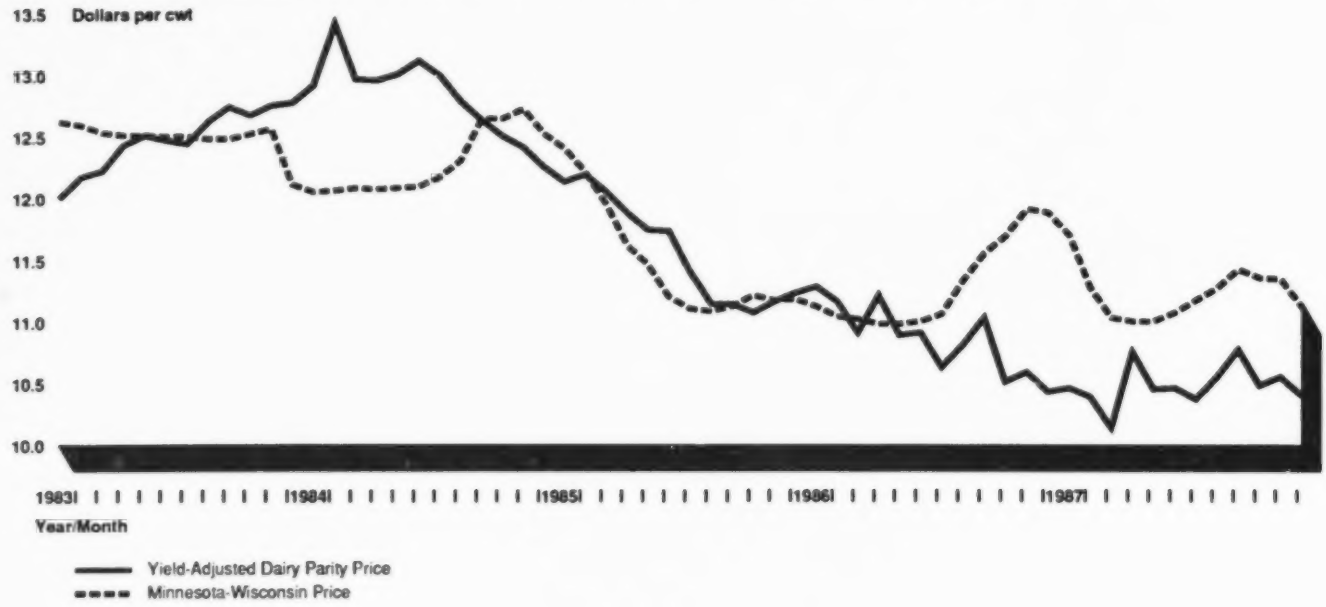


Figure II.9: Comparison of Economic Formula Price With M-W Price—Supply-Demand Adjusted Dairy Parity, 1983-87

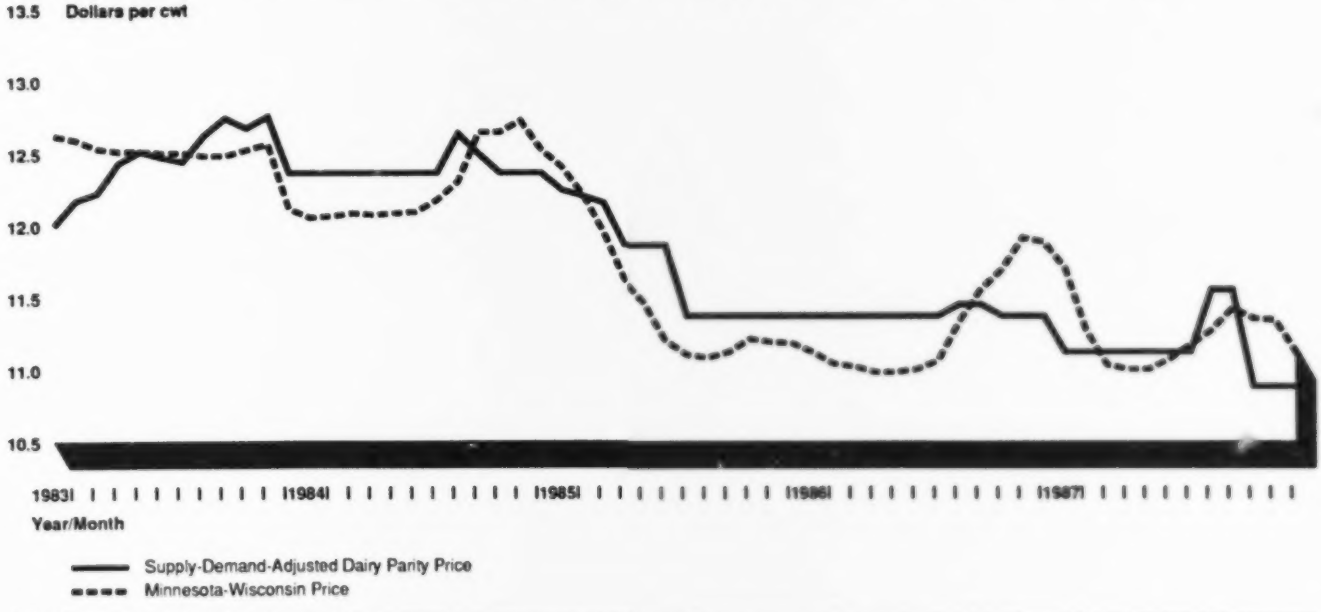


Table II.6: Statistical Summary of Deviations in Economic Formula Measures of Manufacturing Milk Values Versus M-W Price Monthly Observations, 1980-87

	Formula				
Statistical measure	**Dairy parity**	**California modified**	**Ontario modified**	**Yield-adjusted dairy parity**	**Supply-demand adjusted dairy parity**
Actual deviation					
Mean	$−0 123	$−0 076	$0 099	$−0 056	$−0 174
Standard deviation	551	485	896	474	381
Absolute deviation					
Mean	494	424	787	333	350
Standard deviation	273	247	439	341	231
Maximum deviation	880	821	1 566	1 346	663
Minimum deviation	−1 135	−1 141	−1 298	−1 448	−1 049

Note: Deviations are the values derived from the formulas minus the M-W price for the same month.

Compared with the product formulas, these economic formulas do a relatively poor job of tracking the M-W price. Of the three unadjusted formulas, the performance of the California class I modified formula is

slightly superior, but that formula still has an average absolute deviation of 42 cents per hundredweight. All of the unadjusted formulas generated a high manufactured milk value between 1983 and 1984 when manufactured milk prices fell sharply and remained depressed for several months. The dairy parity and California class I modified formulas generate a falling milk value from late 1984 through mid-1986, mirroring a long downward trend in the M-W price. In contrast, the Ontario class I modified formula price, heavily weighted by industrial wages, shows little movement during that period.

The adjusted parity formulas are superior to simple dairy parity in following the M-W price. The yield-adjusted formula generates high prices relative to the M-W price in 1983 and 1984 but closely matches the falling M-W price in 1984 and 1985. The formula yields very low prices in 1986 and 1987, and in particular, shows a directional change relative to the M-W price in the fall of 1986 when competitive pressures boosted milk prices by nearly $1.00 per hundredweight. This pattern demonstrates the need to periodically alter base prices or base years in any economic formula.

Prices generated by the supply-demand adjusted dairy parity formula seldom deviate far from the M-W price. This is not surprising, since the formula prevents prices from deviating from the support level if there is no market pressure. However, the formula is deficient in its ability to signal a price increase if the uncorrected dairy parity price falls below the support level. A more complex adjustment would be necessary to adequately reflect upward price pressure in the manufacturing milk sector.

The economic formulas yielded values for milk used in manufacturing that deviated substantially from the M-W price. In particular, those formulas in which industrial wages and prices were heavily weighted produced prices that failed to fall with reduced milk production costs. Accounting for increasing milk production per cow and tying prices to the level of milk surplus improved the economic formulas' ability to track the M-W price historically.

Administratively Determined Price

An administratively determined price is one set through an administrative process such as a committee, hearing, or panel rather than through a formula or a reported market-determined pay price. Because of the impact of setting the class III price in this manner—at levels higher or

lower than the support price—the only logical level at which to set a price administratively is at the support price level.

The federal government supports the price for milk sold for manufacturing uses by establishing a federal government offer to purchase quantities of butter, cheese, and nonfat dry milk that are offered and meet specification. The government purchase prices, which include allowances to cover processing costs, imply a specified support price for milk sold for manufacturing uses. By setting these manufactured product prices, the government sets a floor on the price of milk used to make these products. Minimum prices for milk used for fluid products (class I) and for cottage cheese, yogurt, and ice cream (class II) are established as fixed differentials over the class III price, which is currently the M-W price in most markets.

Under the administratively determined price alternative, the government would set the minimum price to be paid for class III milk under federal orders and thereby overtly set all minimum prices. For simplicity, minimum class I and class II prices are assumed to remain a fixed differential over the class III price.

The class III price would logically be set at the level of the support price. If the class III price was set above the support price and did not reflect the market price, dairy product manufacturers who could find commercial markets would have a competitive advantage over those who could find no commercial market and would therefore be forced to sell to the Commodity Credit Corporation. If the class III price were set below the support price and did not reflect the market price, inequities would exist between plants located in areas with few manufacturing plants and therefore a less competitive environment, and plants located in heavy manufacturing areas with strong competition for milk. The plants in the areas with less competition could pay a lower price for class III milk than other plants and, therefore, enjoy higher operating margins. Under the current M-W series, the class III price may be set above or below the support price, but the current M-W price reflects market conditions Alternative mechanisms that might be suggested for setting the class III price, such as hearings or committees, would therefore not be practical because decisions to set the class III price at any level other than the support price would be unworkable.

This alternative assumes a continuation of the present policy of adjusting the support price on an annual basis. The Secretary of Agriculture

might, however, be given the authority to raise or lower the support price as needed.

Assuming no change in the price support level, this administered pricing system would operate differently than the current system, because when actual prices for milk used in manufacturing rise above the administered minimum, all other minimum class prices would not automatically rise. They do not rise because the class III price is the support price and the support price is assumed in this case not to change. Currently, when the M-W price rises above the support price, minimum class I and II prices also rise. The administered pricing option would leave the class I and class II price responsive to the market. In this sense, the administered system would leave actual prices more responsive to market conditions than the current method of federal order pricing. If the support price were set at a relatively high level, all class prices would probably be resting on their respective minimums and the Commodity Credit Corporation would be buying stocks.

If the support price were set relatively low, all prices paid for milk, being market-determined, would probably be above their respective minimums. In this latter case, inequities could develop between manufacturing plants where competition for obtaining milk is keen (such as the Upper Midwest) and markets in which there is little or no competition for class III milk; that is, prices paid by manufacturing plants would be higher in the competitive markets than in markets with less competition. This situation does not happen under the current system because the M-W price paid for grade B milk is used throughout the federal order system to price class III milk.

Comments From the U.S. Department of Agriculture

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

June 27, 1989

Mr. John W. Harman
Director, Food and Agriculture Issues
Resources, Community and Economic
Development Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Harman:

Thank you for the opportunity to review a draft of the General Accounting Office (GAO) report, "MILK PRICING: Method for Setting Farm Milk Prices Needs to be Changed" (GAO/RCED-89-151). We share GAO's interest in developing alternative formulas for moving minimum class prices under Federal milk orders. It is important that the order program continue to adapt to changes in the milk marketing system if it is to continue as a viable marketing tool for producers while serving the public interest.

In this report, GAO concludes that because of a continuing decline in the production of Grade B milk, the Minnesota-Wisconsin manufacturing grade milk price (M-W price) is becoming less reliable as a "fair indicator of the value of milk used in manufacturing." GAO indicates that although certain short-term changes could be made to shore up the validity of the M-W price, the critical issue is to find an appropriate replacement for that price series.

On this basis, GAO evaluated five pricing mechanisms as alternatives to the M-W price. Based on the evaluation, it recommends that the Secretary of Agriculture choose either a regulated Grade A price series or a product price formula as the eventual replacement for the M-W price, but recognizes that further refining and testing would be necessary before a new price series is implemented.

The M-W price has served well as a mover of minimum class prices in Federal order markets. Although Grade B milk supplies continue to decline, over half of such milk is still produced in Minnesota and Wisconsin. The Department, as well as many members of the dairy industry, believes that this provides an adequate base for determining the M-W price. It is our view that the M-W price still is as good a means as exists for moving minimum class prices in Federal order markets and is a reliable measure of supply-demand conditions in the dairy industry. As GAO properly points out, there is no way of knowing at this time when the decline in Grade B milk supplies will be significant enough to negate the M-W price's usefulness.

USDA has long recognized the need to develop an alternative formula to eventually replace the Minnesota-Wisconsin price series and has encouraged and supported research in this area. We welcome the contribution of the General Accounting Office in this effort. GAO's conclusion concurs with our past research that a competitive pay price and a product price formula are viable alternatives, although the latter is usually considered less preferable.

GAO recommends that the Secretary select one of its alternatives and then "refine, test and hold hearings with the dairy industry, before implementing the new milk price series." This comports with Department policy of (a) helping the industry find solutions to issues facing the milk order program, and (b) soliciting industry participation in arriving at solutions that are workable, acceptable and understandable.

Equally important, the recommendation allows for continuation of the longstanding and successful administrative procedure for adopting changes in the Federal order program. Over the years, the order program has placed primary responsibility on the dairy industry to propose and support needed changes in the program. We believe that this study provides a framework for further analysis by the industry members and that the study should be widely distributed within the industry. The Department stands ready to give consideration to pricing mechanisms put forth by the industry to replace the M-W price series.

Enclosed are comments on the GAO report by USDA's Agricultural Marketing Service, Agricultural Stabilization and Conservation Service, Economic Research Service, and National Agricultural Statistics Service.

Sincerely,

Jo Ann R. Smith
Assistant Secretary
Marketing and Inspection Services

4 Enclosures

The following is GAO's comment on the Department of Agriculture's letter dated June 27, 1989.

GAO Comments

1. The referenced comments are not included in this appendix. We have incorporated them into our final report, as appropriate.

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